

I. CINE, H. GRAUDONE

# FIRST STEPS IN MATHEMATICS





2

3

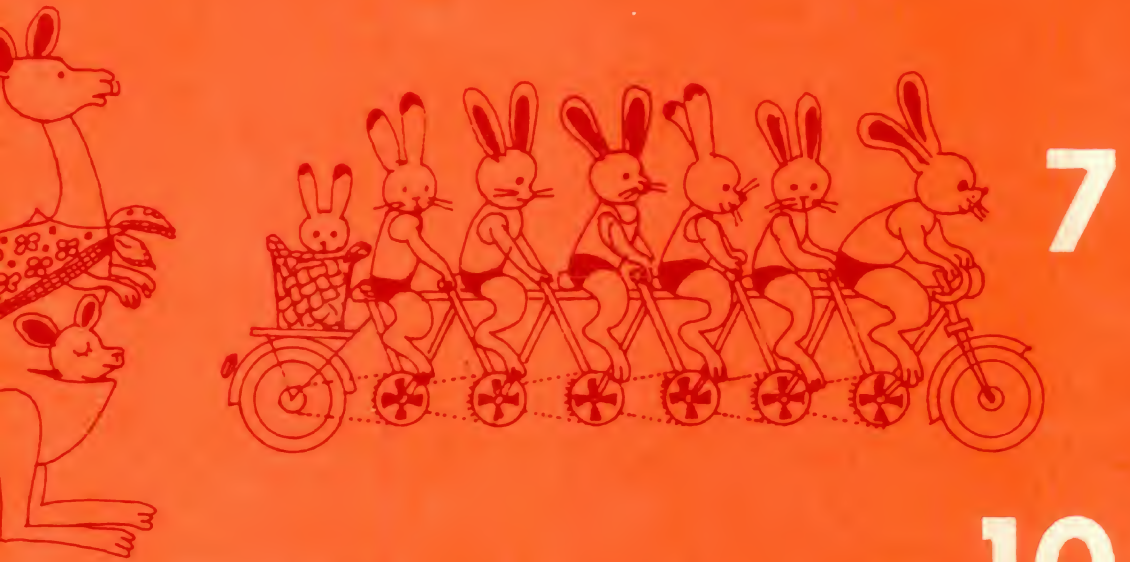
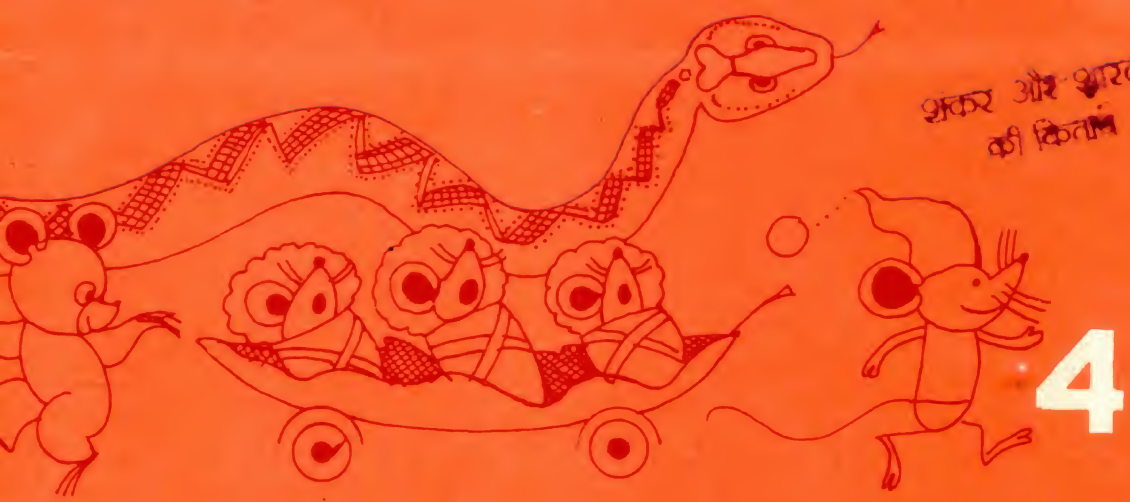
5

6

8



भुकर और भुकरा  
की कितनी



I. CINE, H. GRAUDONE

# FIRST STEPS IN MATHEMATICS



For pre-schoolage children



«ZVAIGZNE» PUBLISHERS



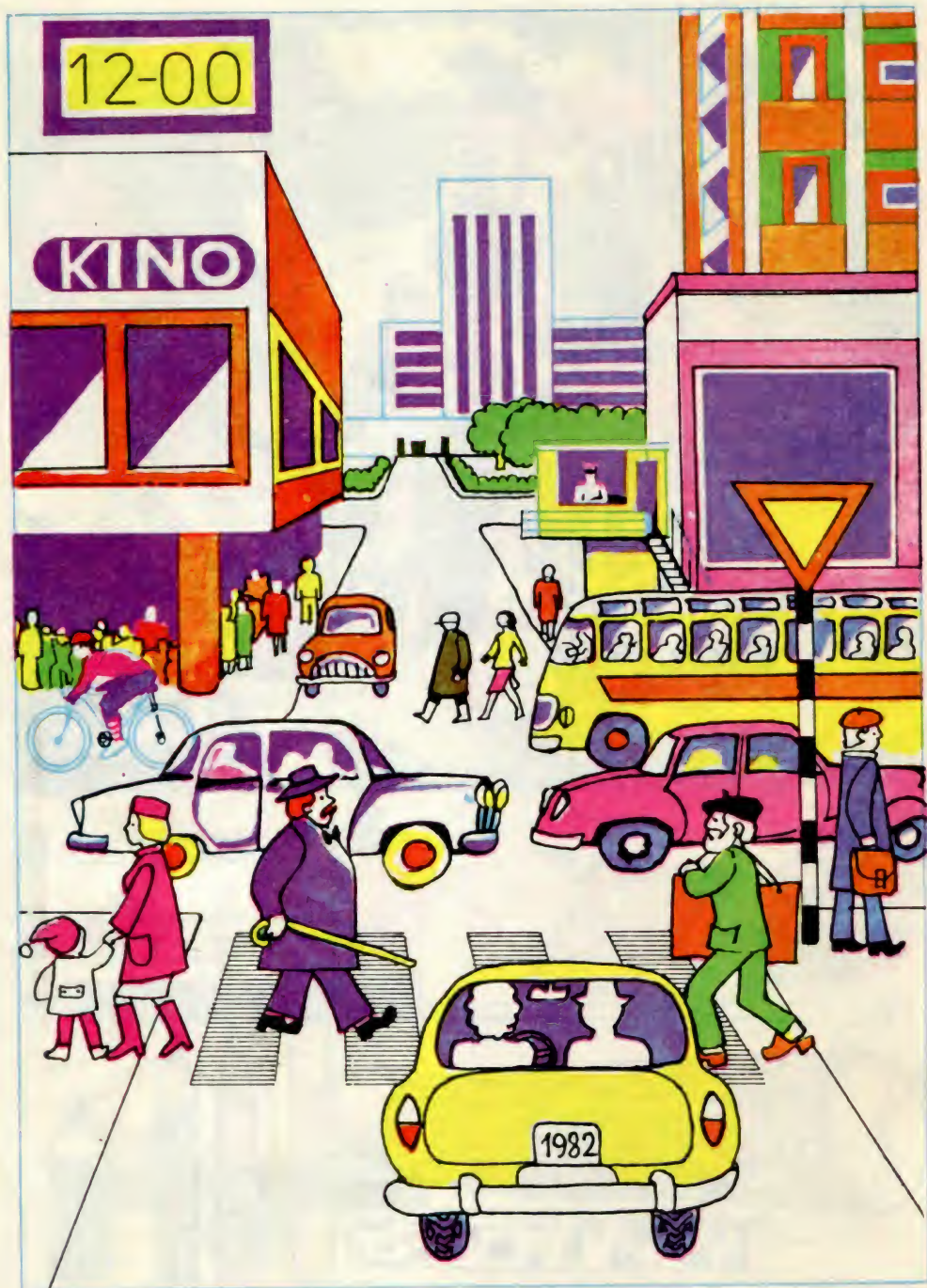
# МАТЕМАТИКА



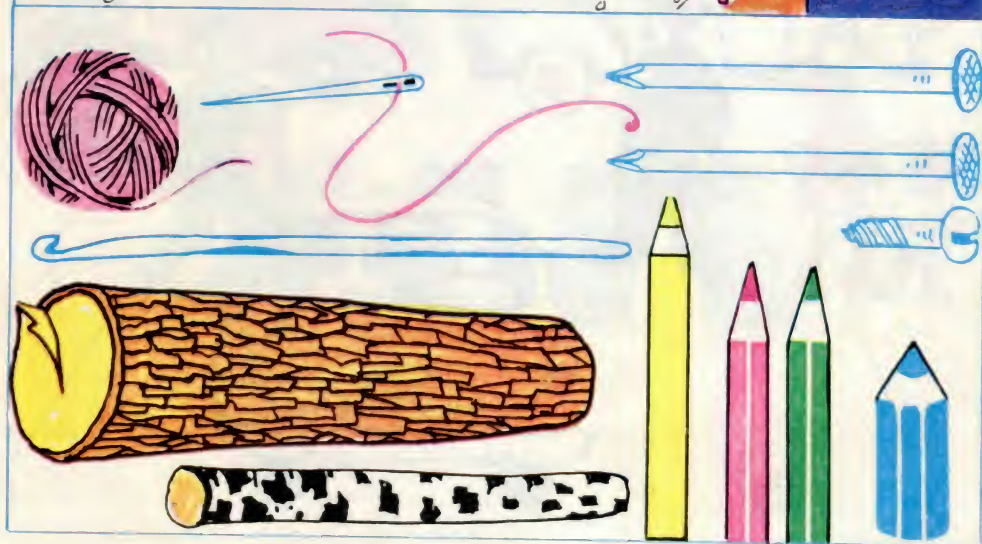
Translated from Latvian by **Jānis Cērps**

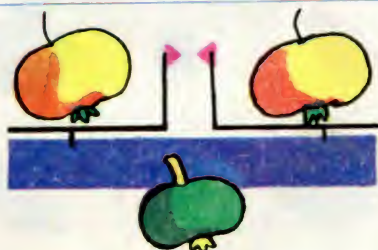
Illustrated by **Aina Lubgāne**

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«Zvaigzne», 1987  
Printed in USSR

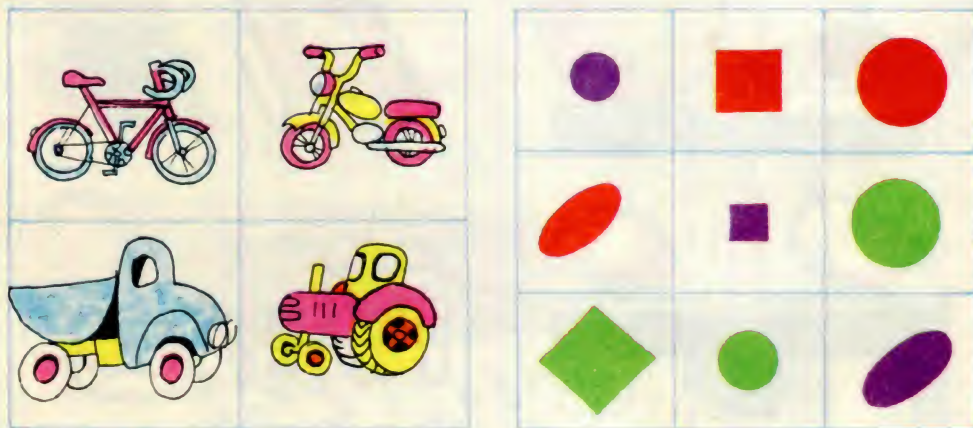
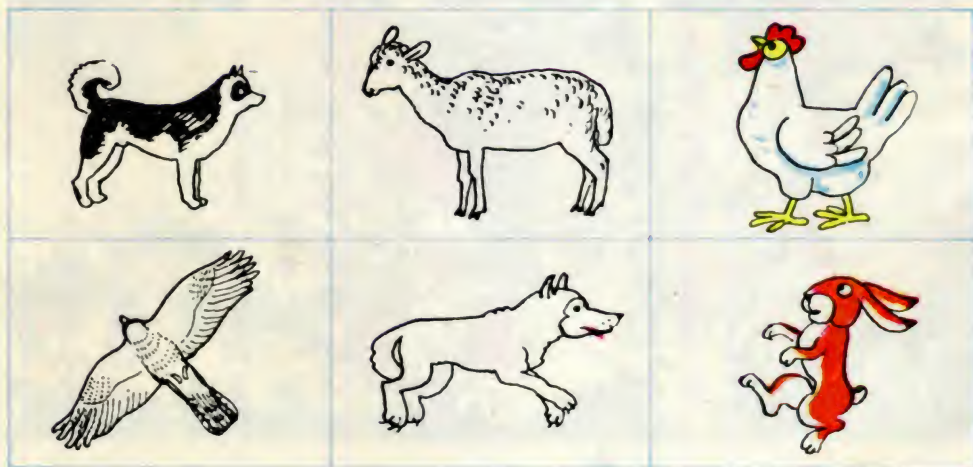


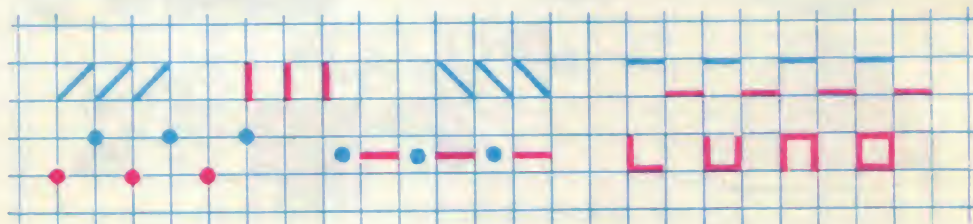
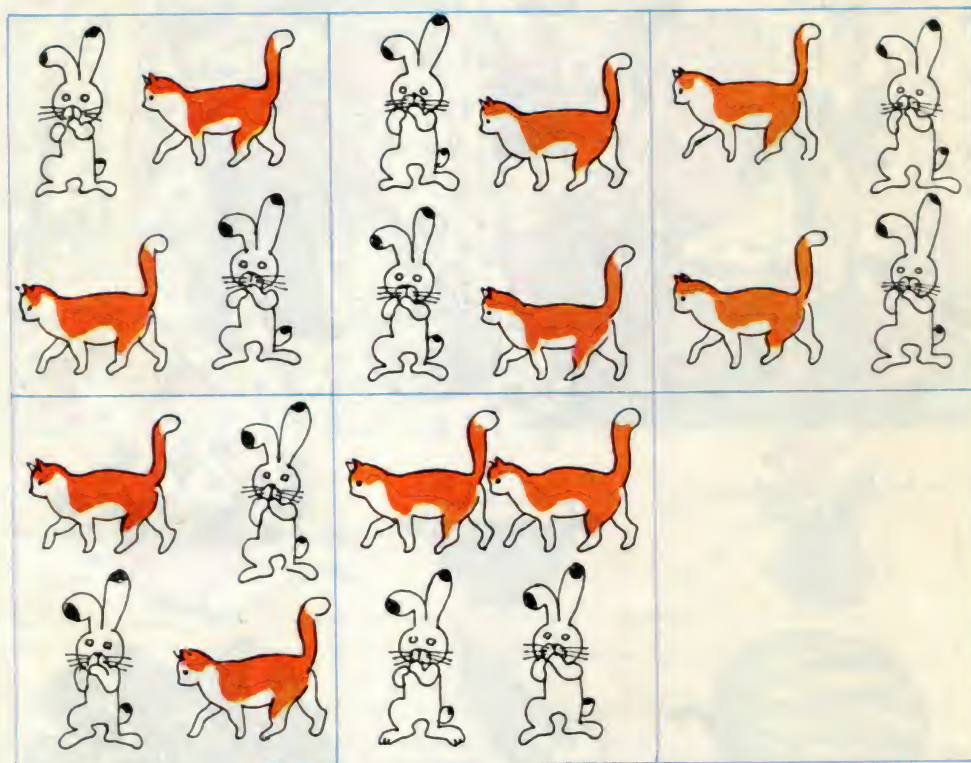
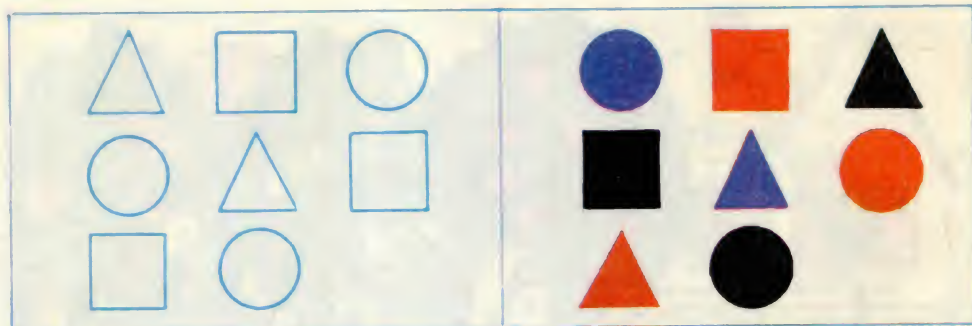




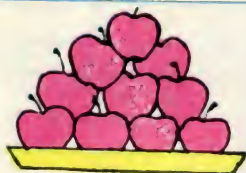
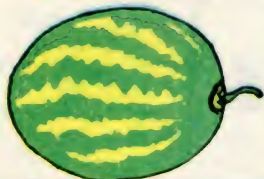


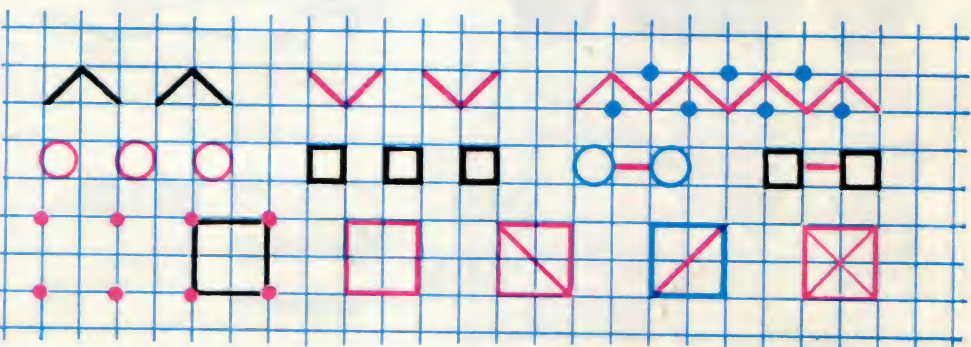
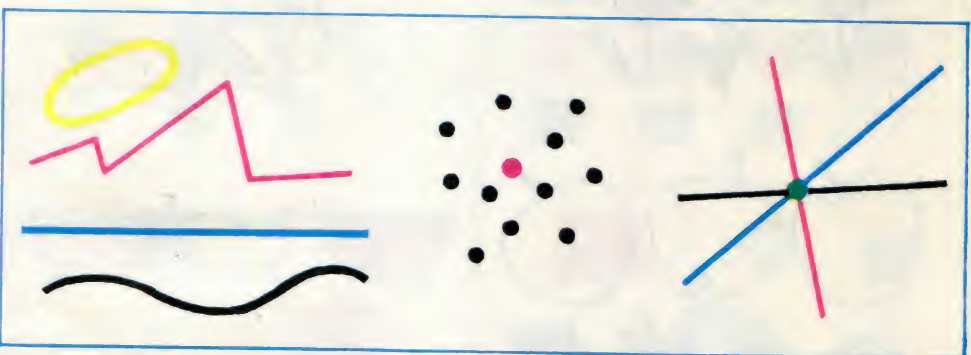
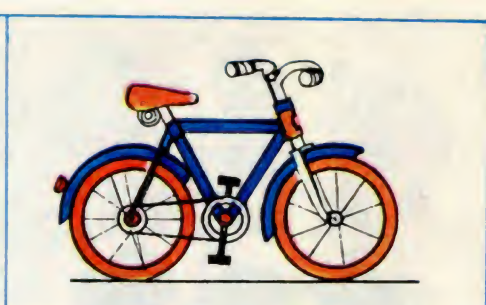




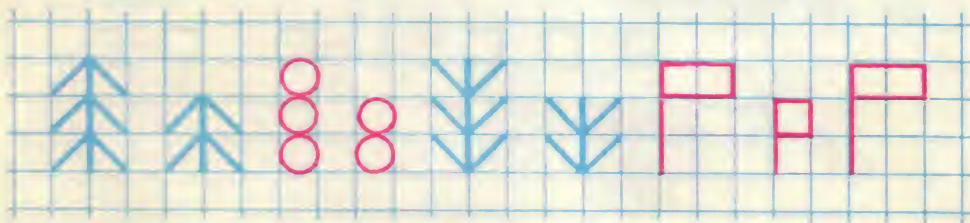
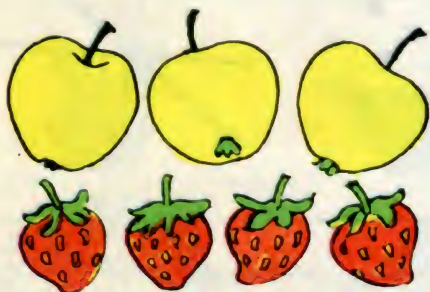
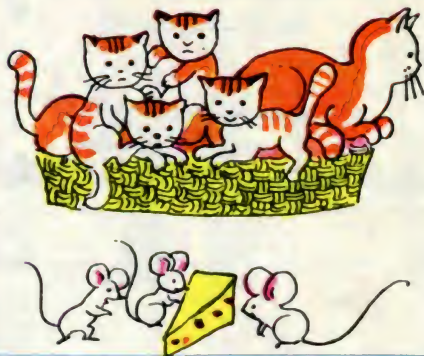
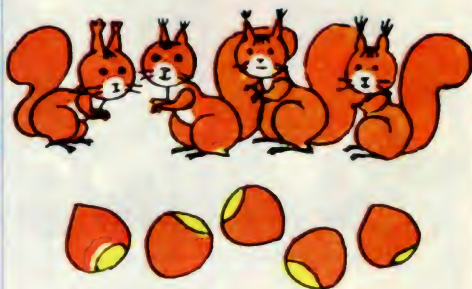
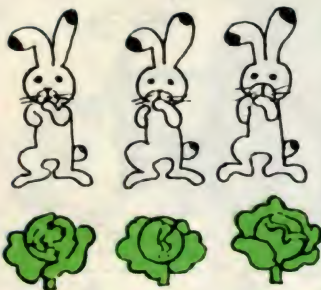


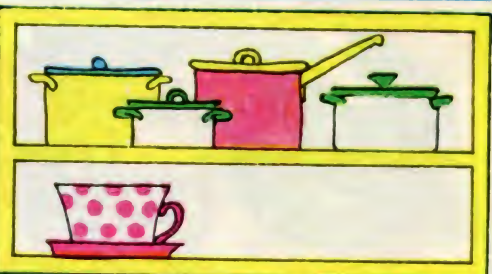
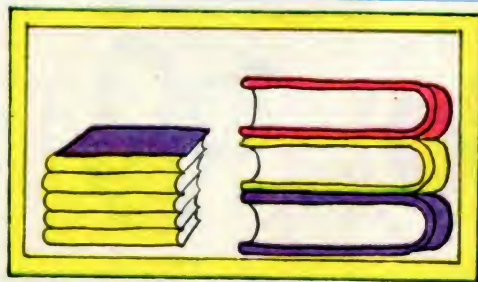
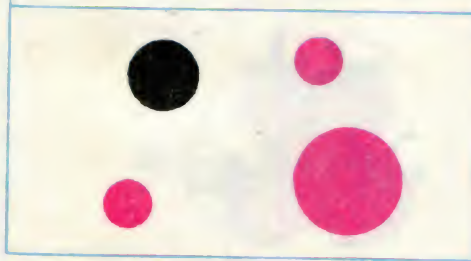




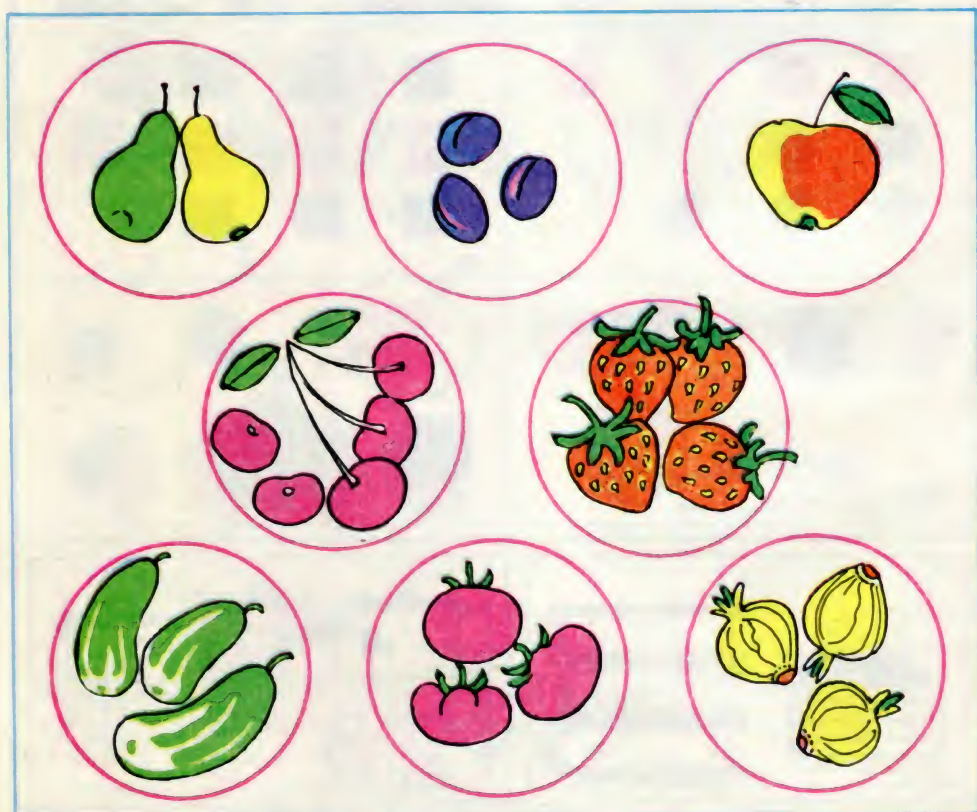
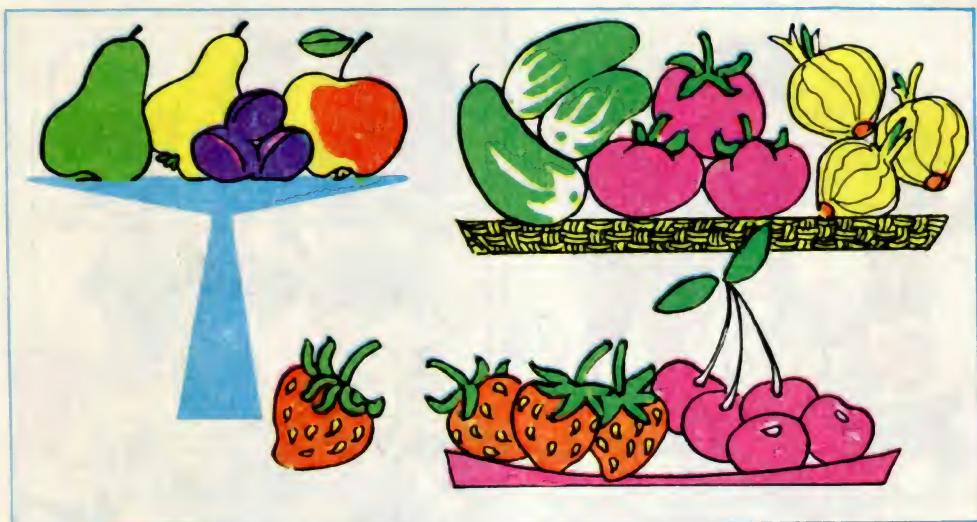


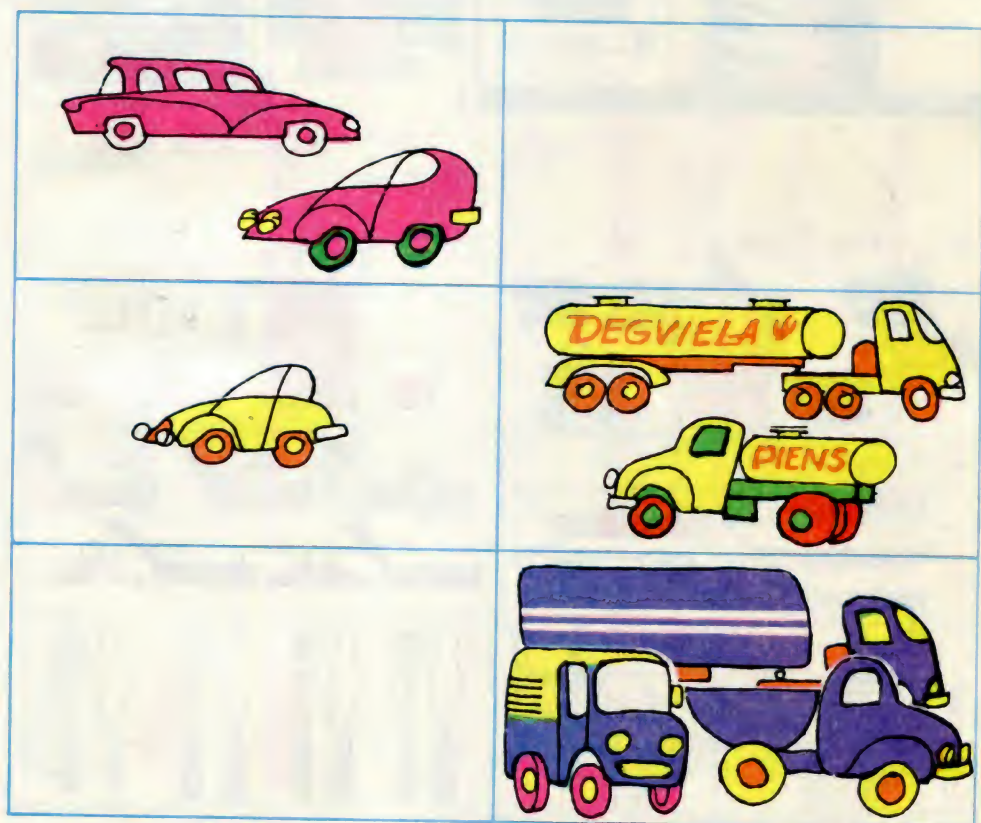
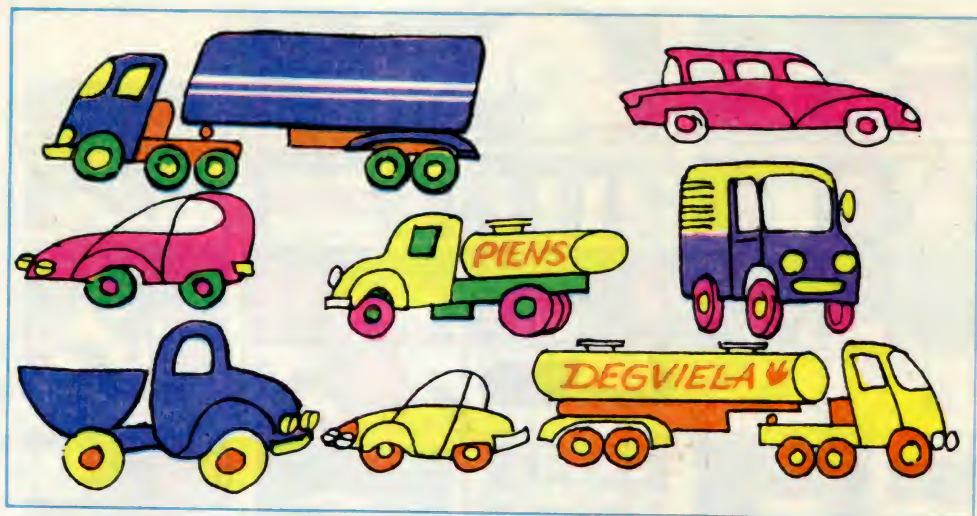






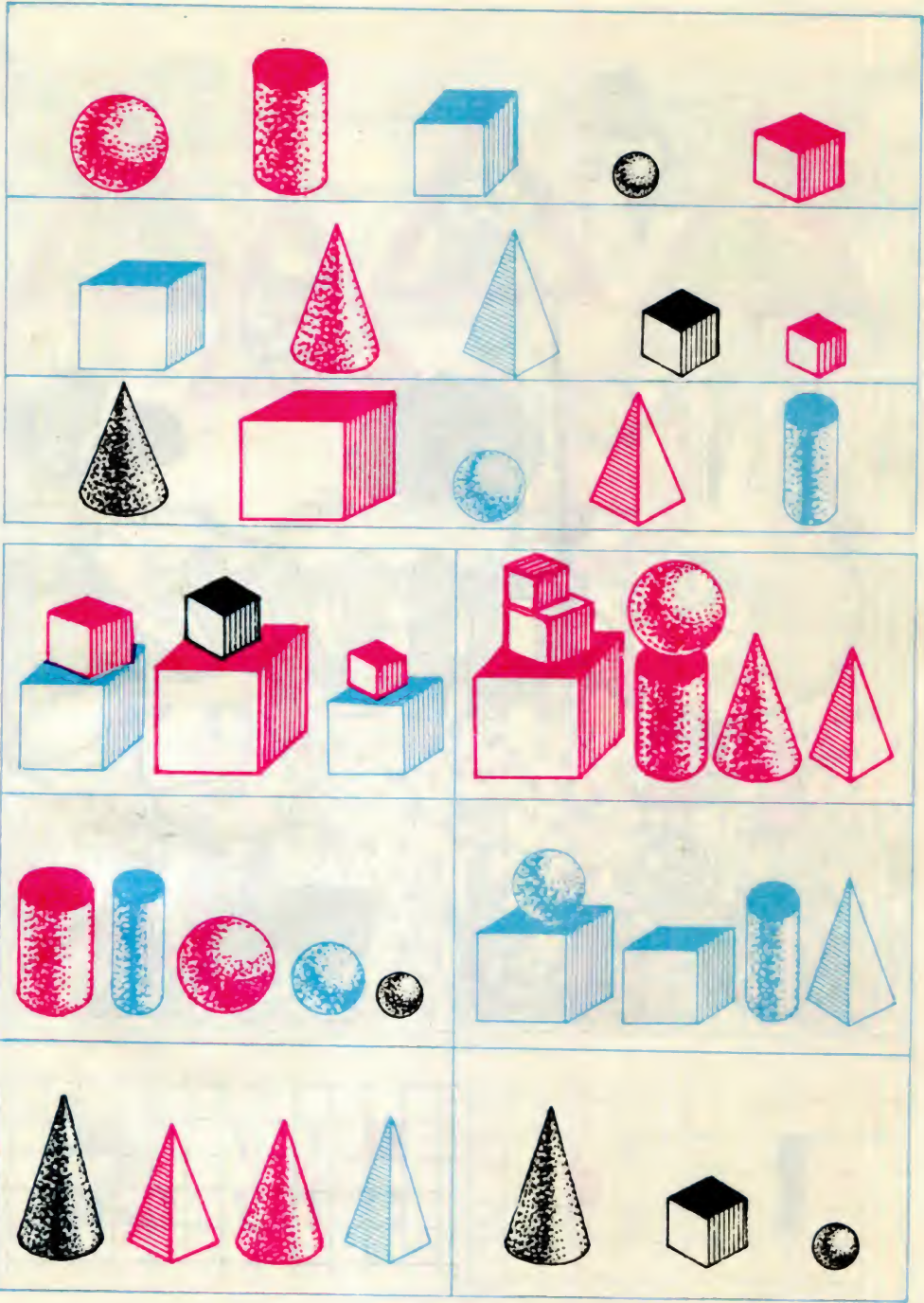




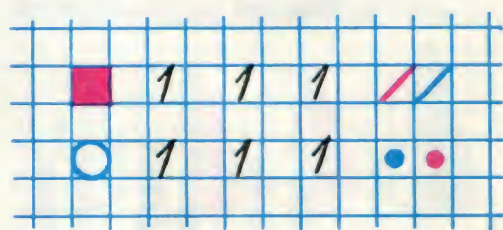
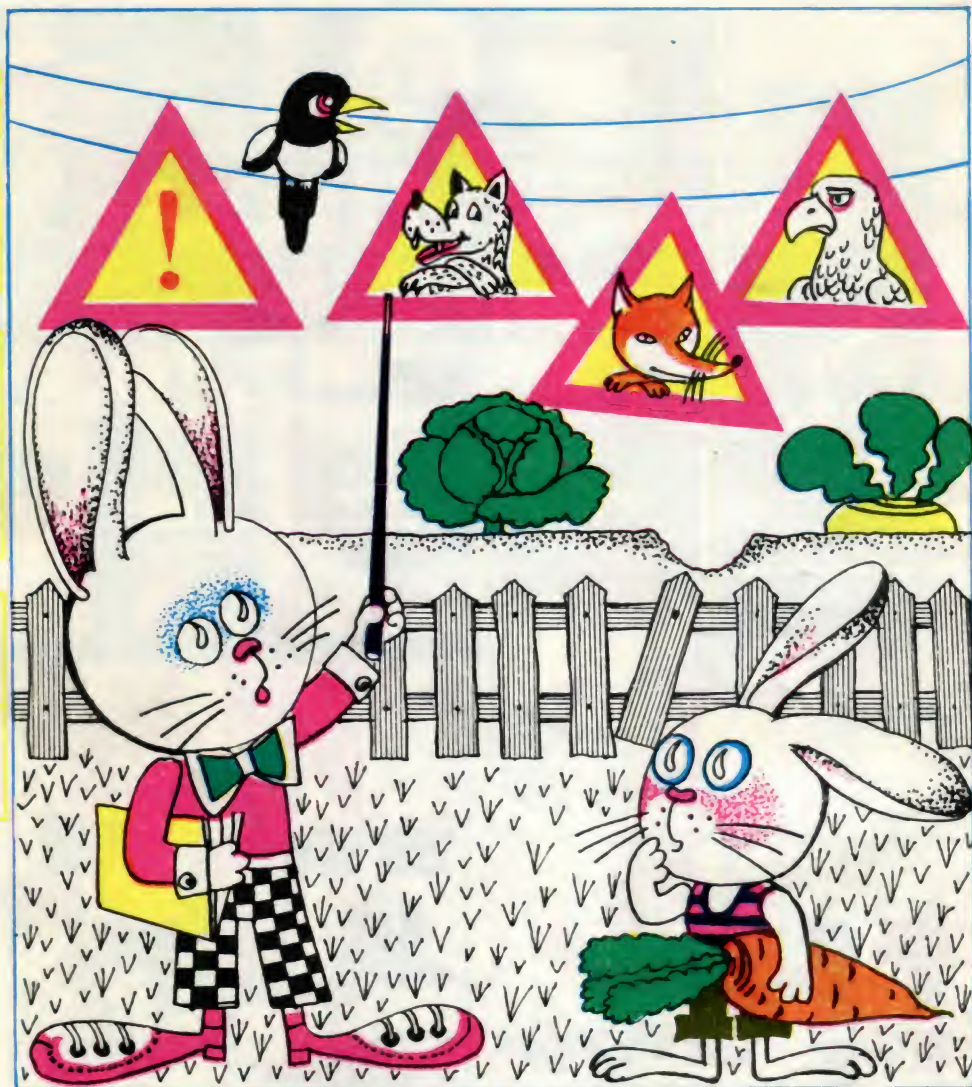


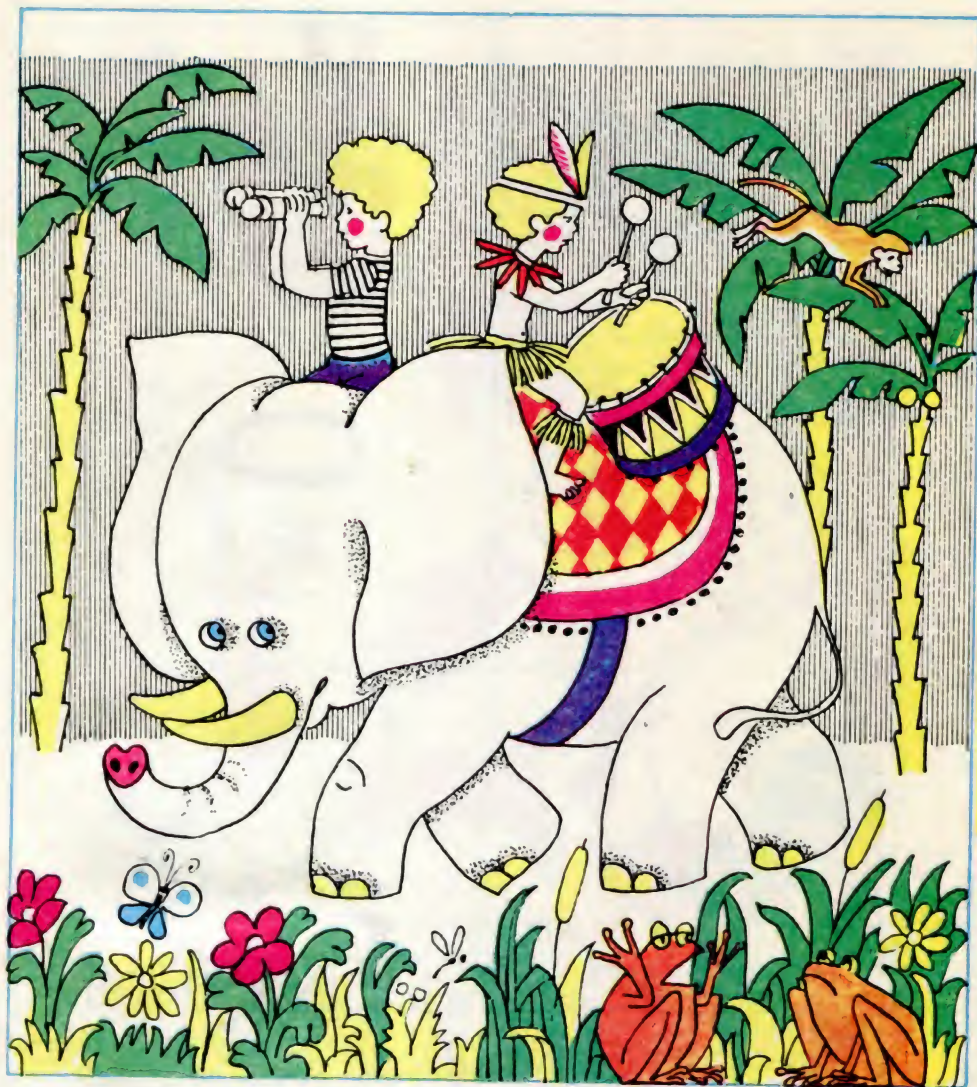




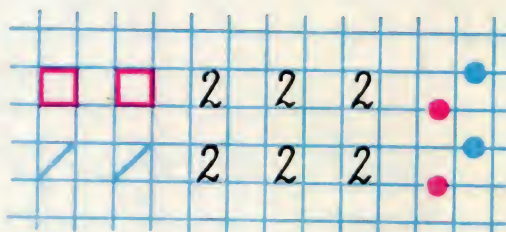




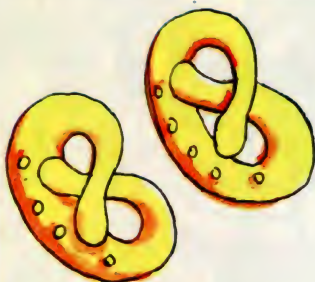




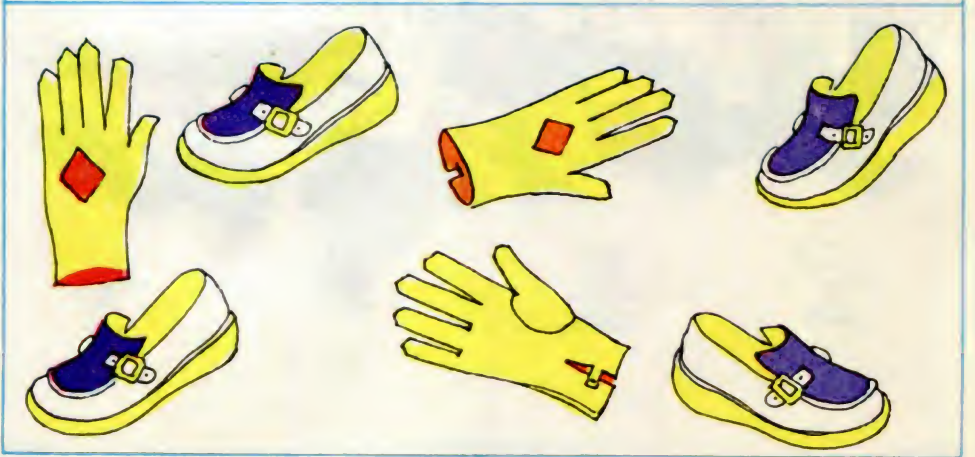
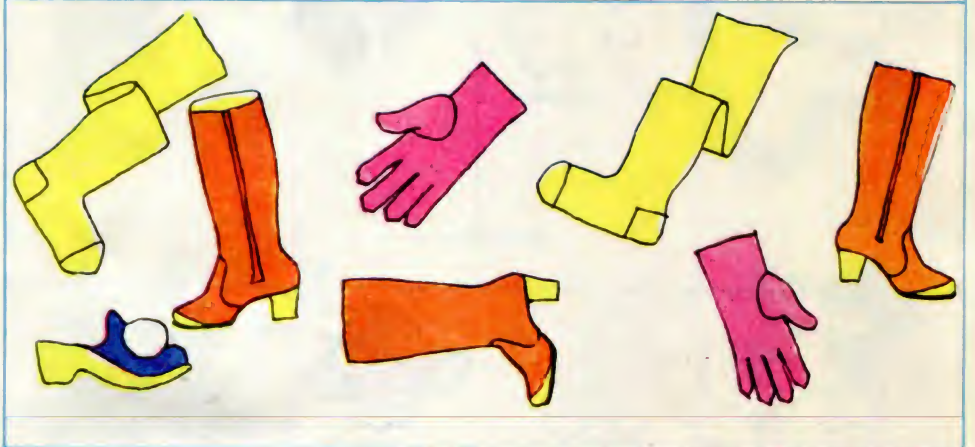
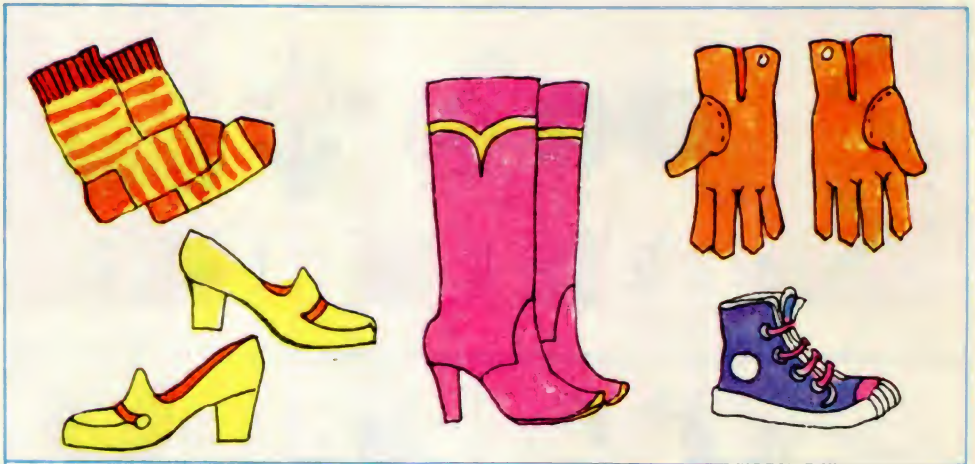
2

















□	1	1	1	○	1	1	1	△	1	1	1
□	□	2	2	○	○	2	2	△	△	2	2
<	<	<	>	>	>	=	=	=	+	-	

















		
	<div>2 &gt; 1</div>	<div>1 &lt; 2</div>

	
<div></div>	<div></div>

			
			
<div></div>	<div></div>	<div></div>	<div></div>

=		
	1 = 1	2 = 2



		
		
		
		

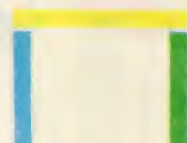
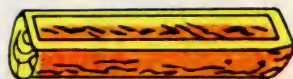
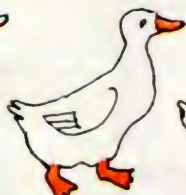
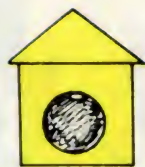




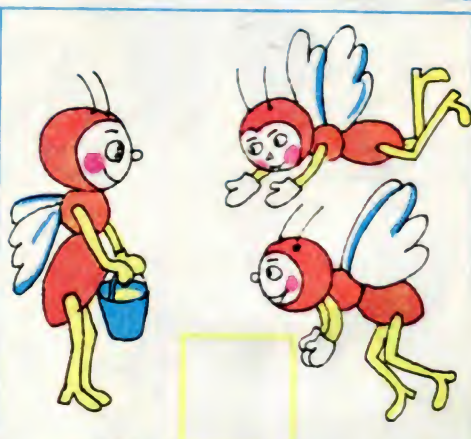
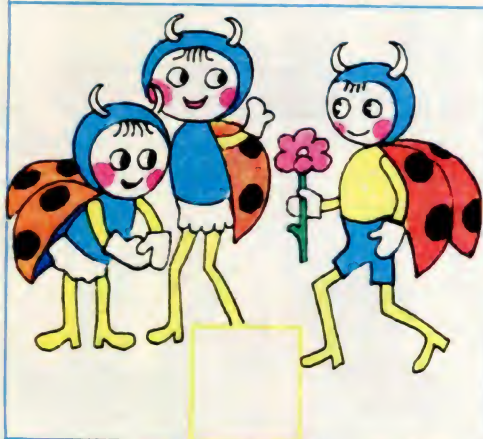
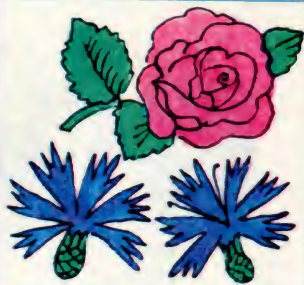
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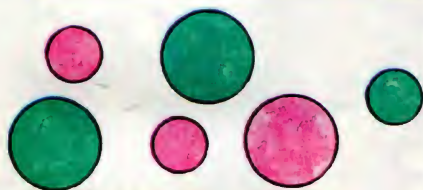
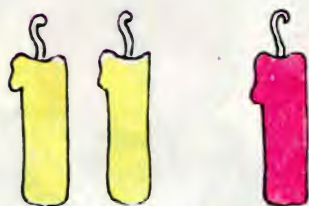
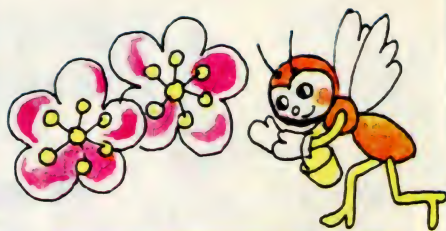


	3	3	3	
1	2	3	3 >	2









1 < 2

2...3

3...3

1...3

2...1

2...2

3...2

1...1

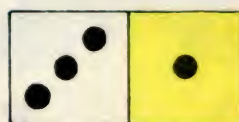
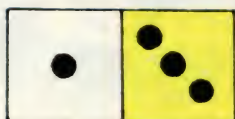
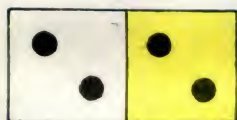
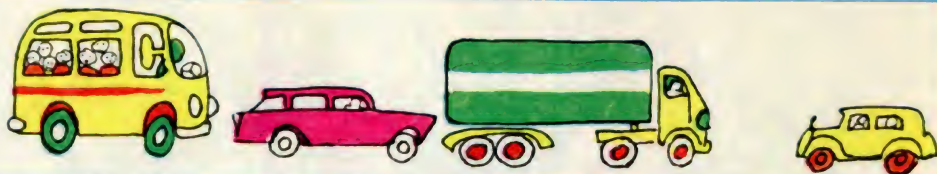




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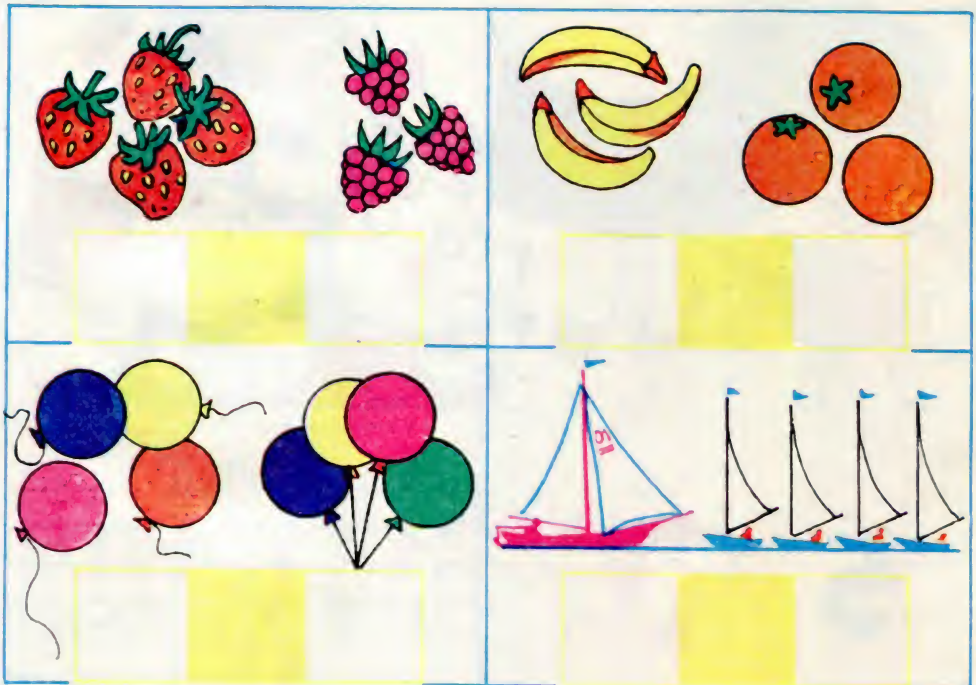
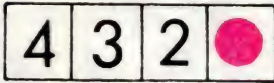
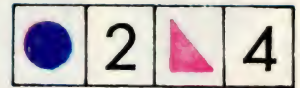
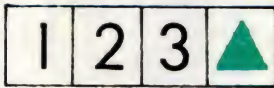
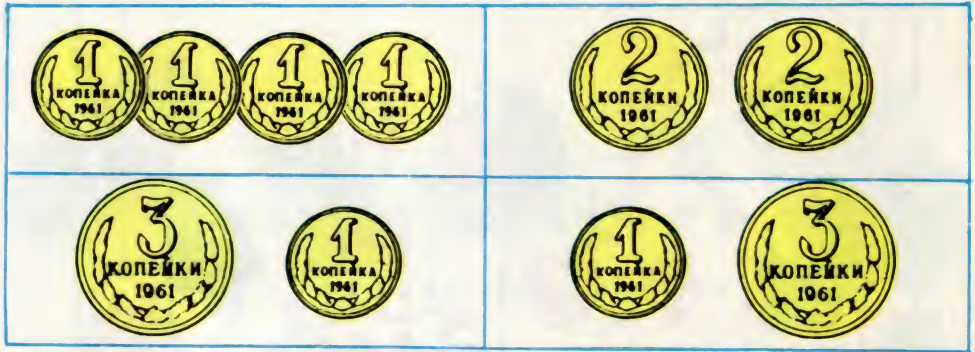
●	●	4	4	4	■	■
●	●	1	2	3	4	>3



$4 > 1$      $1 \dots 4$      $4 \dots 4$      $2 \dots 1$   
 $2 \dots 4$      $4 \dots 2$      $3 \dots 4$      $2 \dots 3$



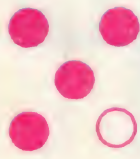




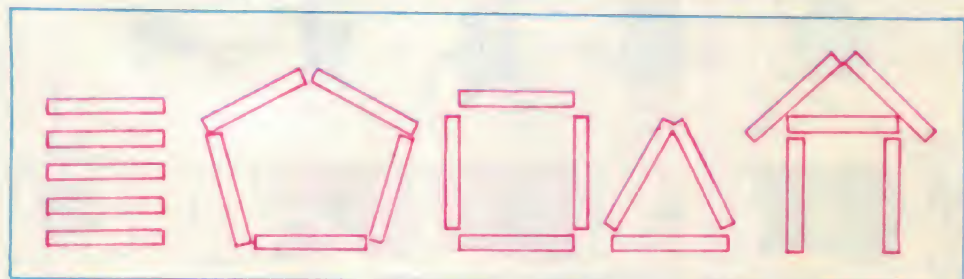
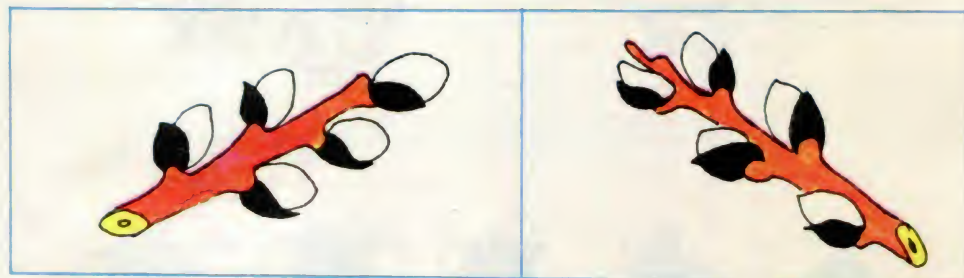




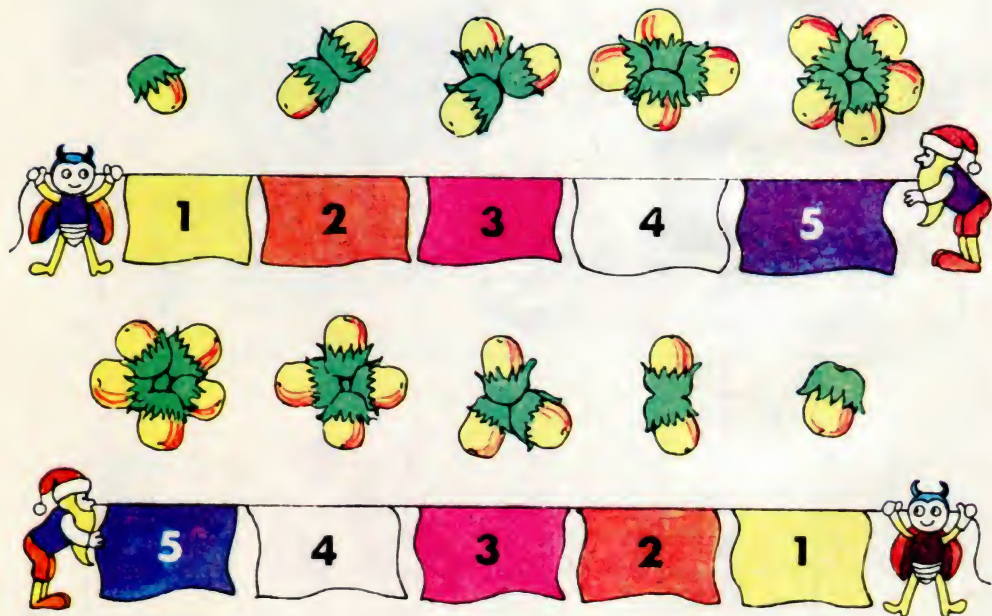
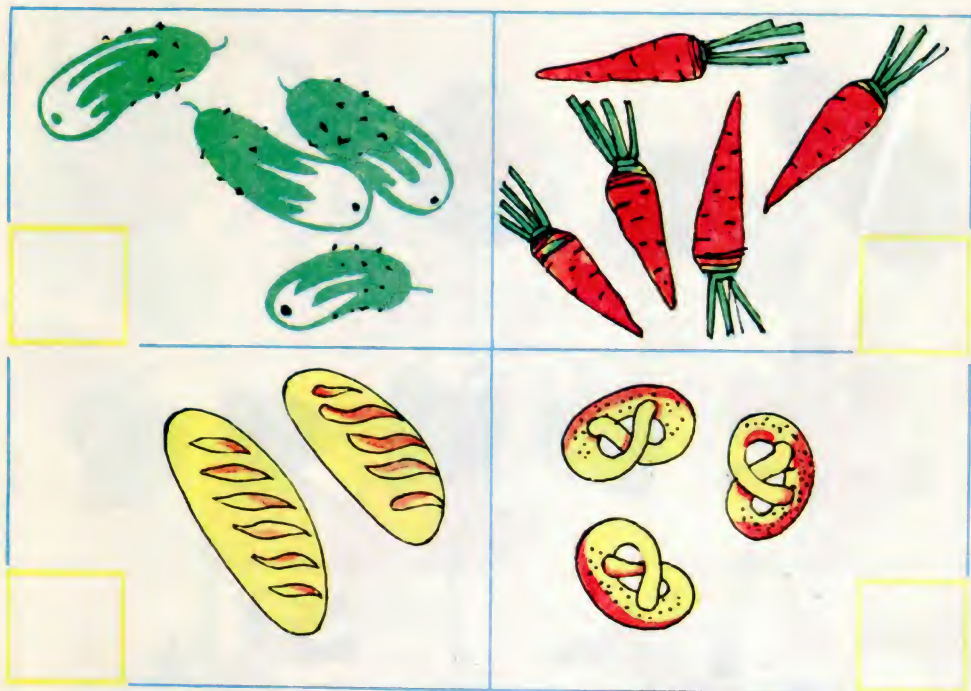
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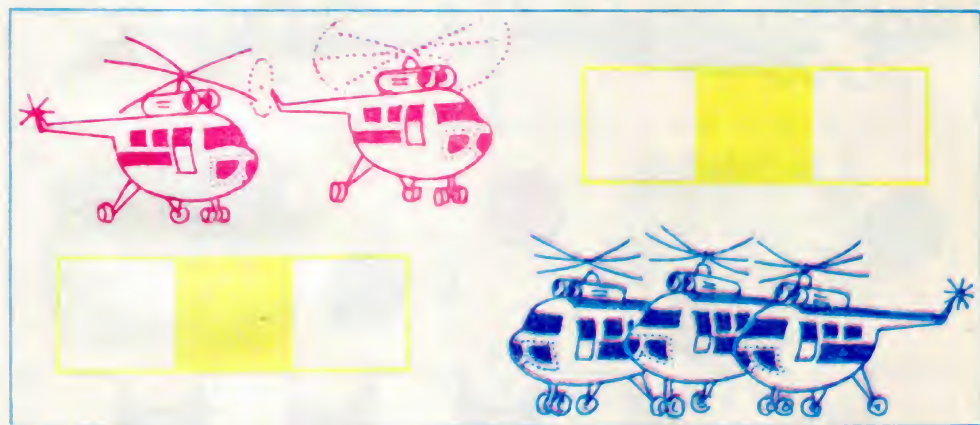
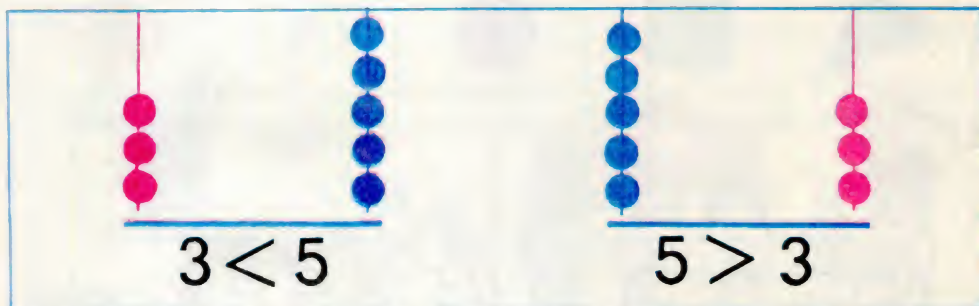
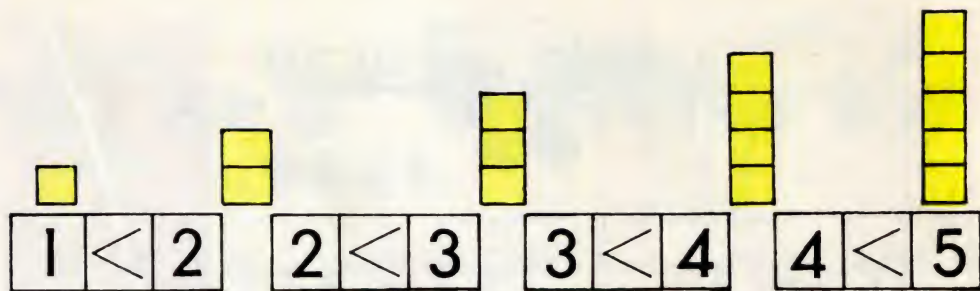


5	5	5	
3	2	1	5 > 4







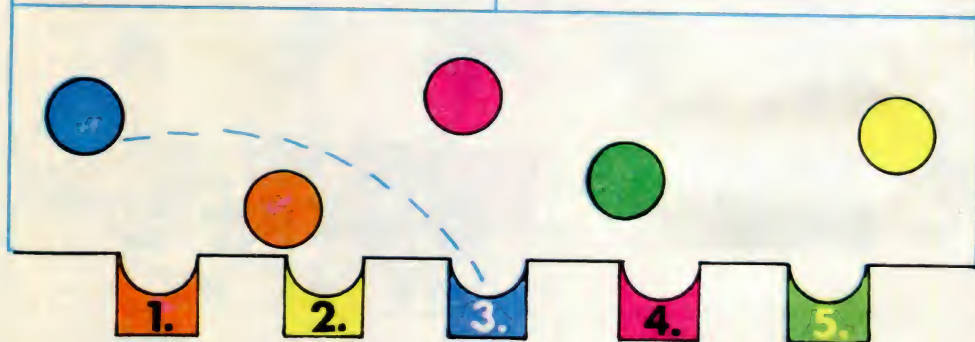
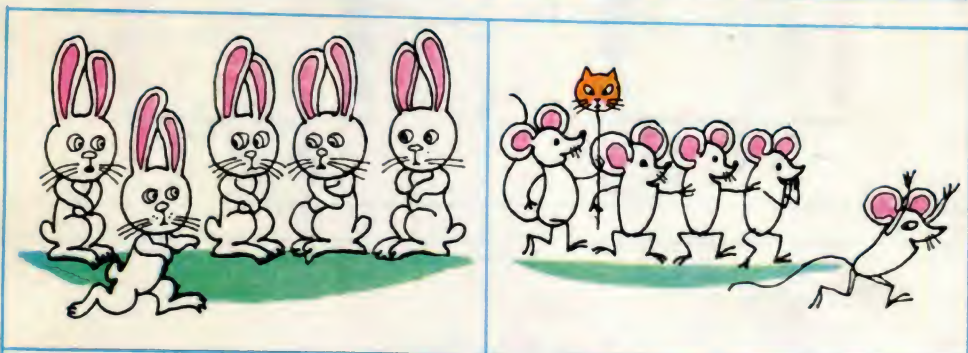


1 < ...    ... < 4    5 = ...    3 > ...  
 5 > ...    4 < ...    2 < ...    3 < ...

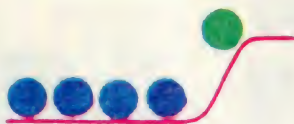




The first	The second	The third	The fourth	The fifth



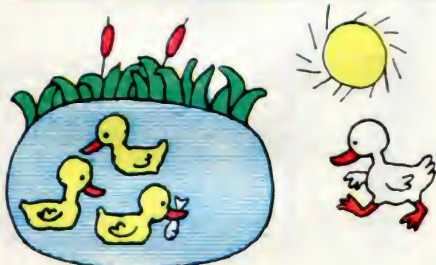
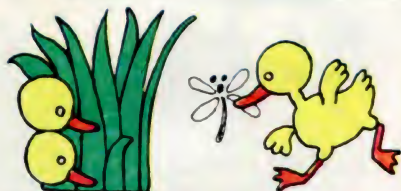
+



$$4 + 1$$



$$3 + 2$$



$$3 + 1$$



$$3 + 1 = 4$$

$$3 + 1 = 4$$

$$1 + 1 =$$

$$2 + 2 =$$

$$3 + 2 =$$

$$2 + 1 =$$

$$4 + 1 =$$

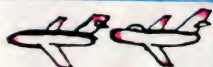
$$1 + 2 =$$

$$2 + 3 =$$

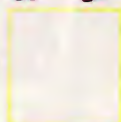




$$2+1=$$



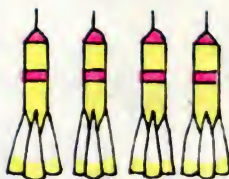
$$3+2=$$



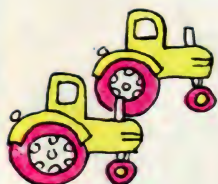
$$3+$$



$$=$$



$$+1=$$



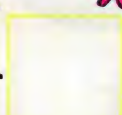
$$2$$



$$2=$$



$$+$$



$$=$$



$$2+1=$$

$$3+1=$$

$$2+2=$$

$$3+2=$$

$$1+1=$$

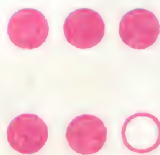
$$4+1=$$

$$2+3=$$

$$1+4=$$

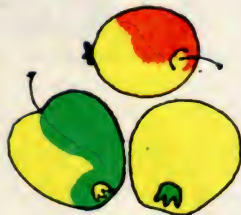
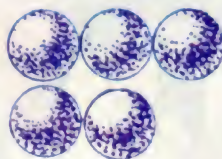


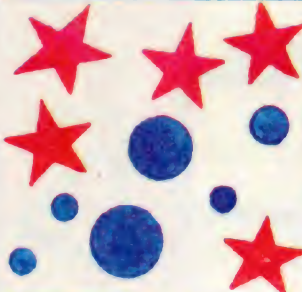


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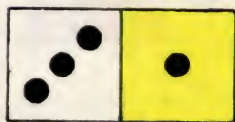
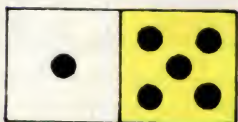
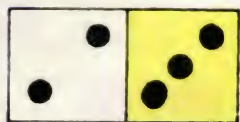
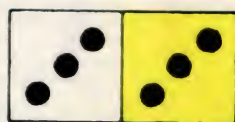
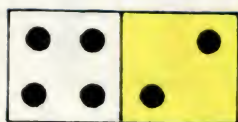
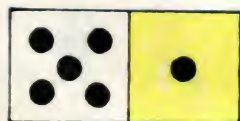
6	6	6	△	△
4	5	6	6 > 5	



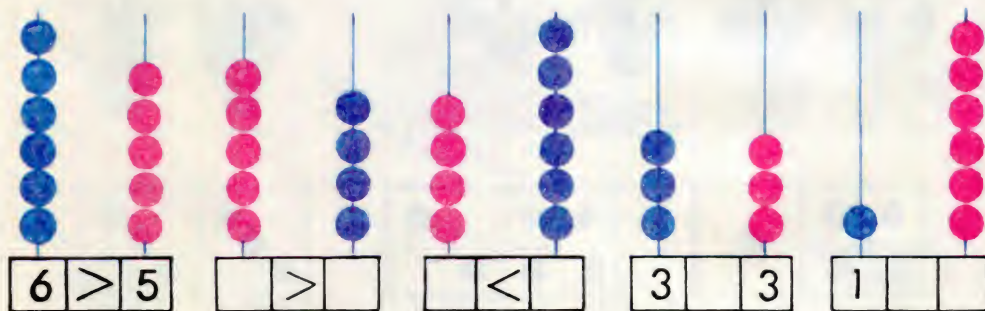
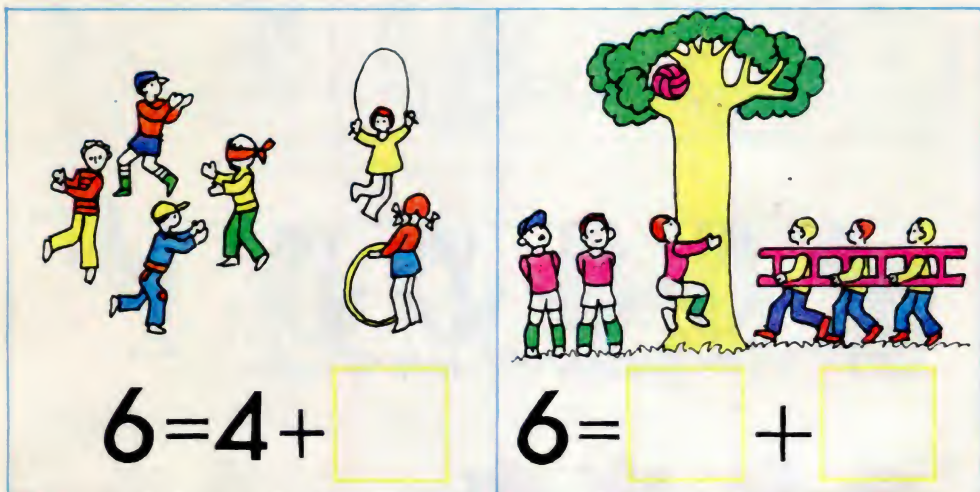
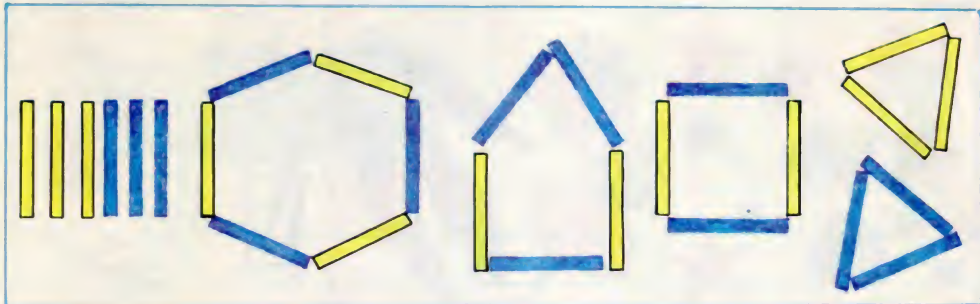


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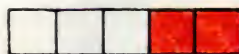
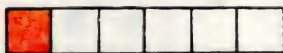
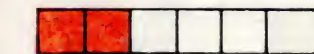
	
	


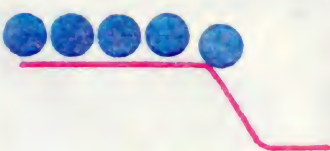











$$6 = 3 + 3$$

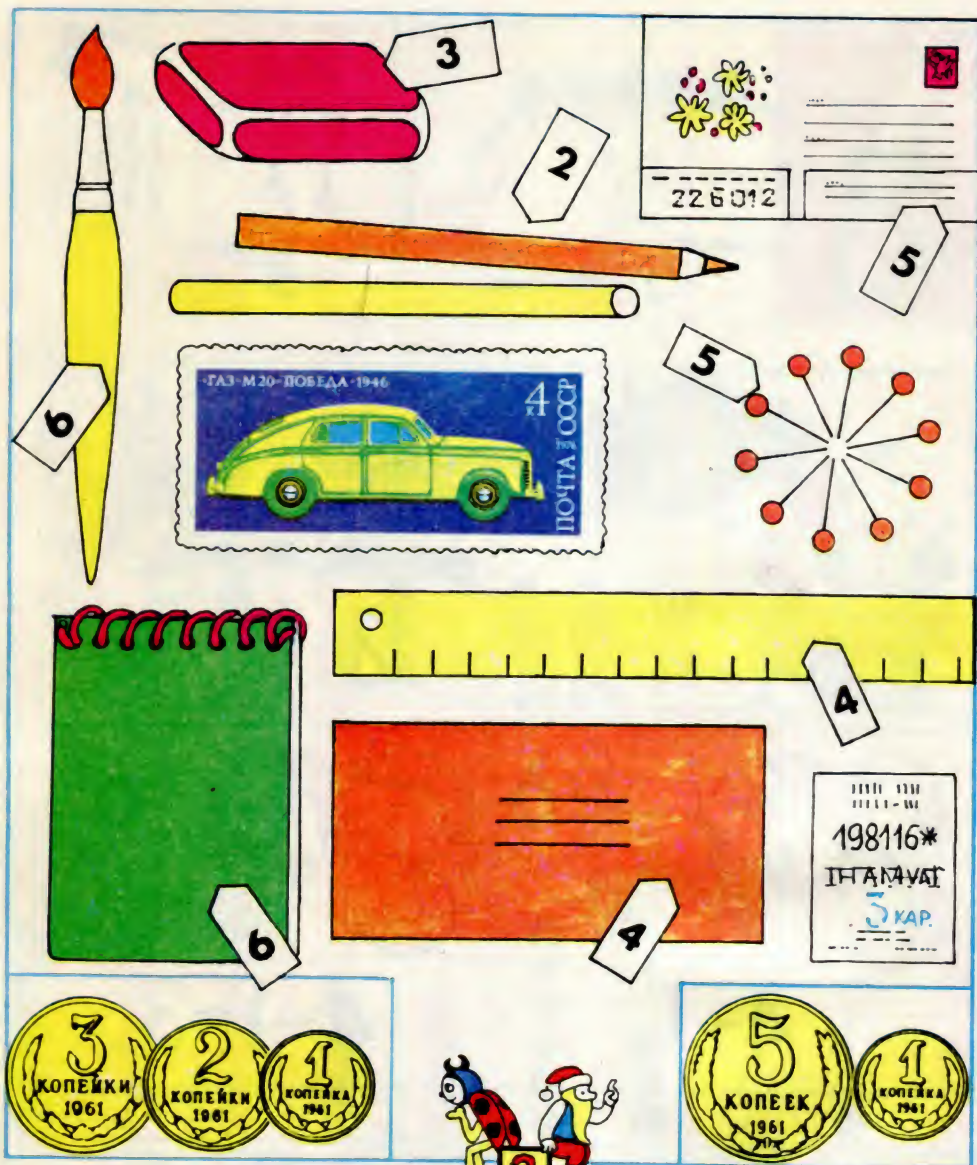


	 <div data-bbox="361 297 585 368" style="border: 1px solid black; padding: 5px; display: inline-block;"> <math>5 - 1</math> </div>	 <div data-bbox="734 297 958 368" style="border: 1px solid black; padding: 5px; display: inline-block;"> <math>3 - 1</math> </div>
---	---	---

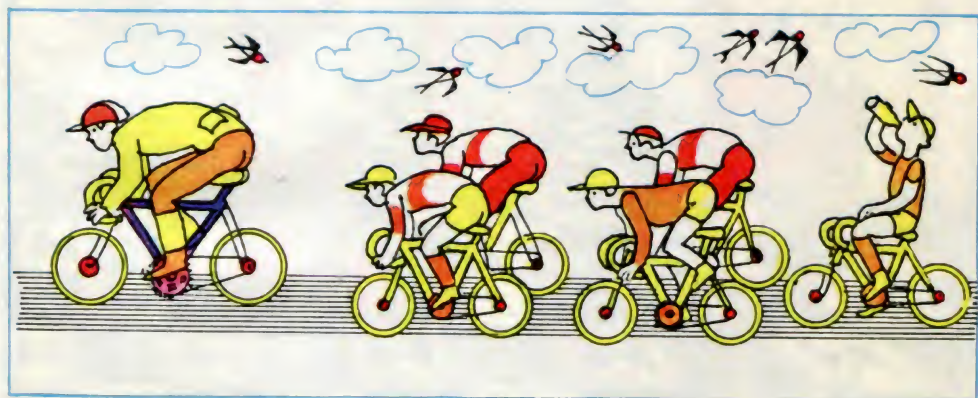
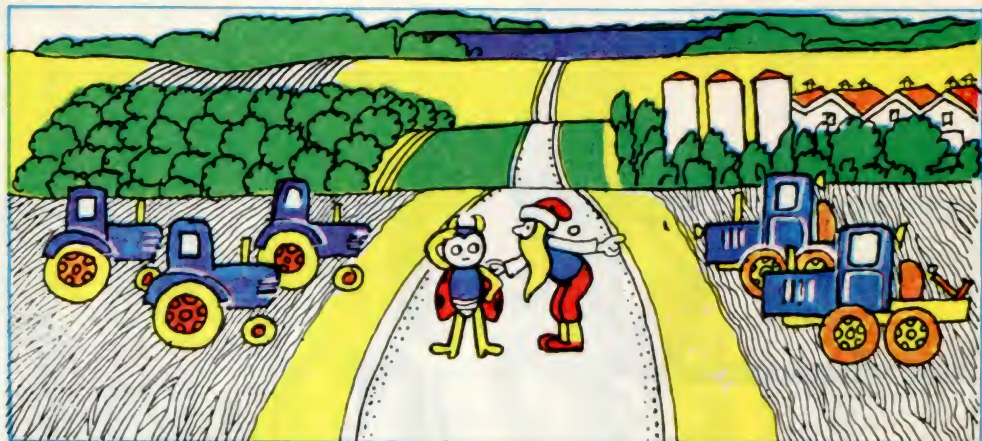
 <div data-bbox="200 666 436 776" style="border: 1px solid black; padding: 10px; display: inline-block;"> <math>6 - \square</math> </div>	 <div data-bbox="654 666 970 776" style="border: 1px solid black; padding: 10px; display: inline-block;"> <math>4 - \square</math> </div>
 <div data-bbox="258 1034 390 1121" style="border: 1px solid black; padding: 10px; display: inline-block;"> <math>4 - 1</math> </div>	 <div data-bbox="671 1034 912 1121" style="border: 1px solid black; padding: 10px; display: inline-block;"> <math>4 - 1 = 3</math> </div>

$5 - 1 = 4$	$4 - 1 =$	$3 - 2 =$	$5 - 2 =$
$3 - 1 =$	$4 - 2 =$	$2 - 1 =$	$4 - 3 =$





$4 + 1 =$	$3 + 2 =$	$6 - 2 =$	$2 - 1 =$
$4 - 1 =$	$5 - 2 =$	$4 + 2 =$	$1 + 4 =$



$$6 < 4$$

$$5 > \bullet$$

$$3 = \bullet$$

$$1 < \star \blacktriangle > \blacklozenge$$

$$3 < \bullet$$

$$5 < \blacksquare$$

$$3 > \star$$

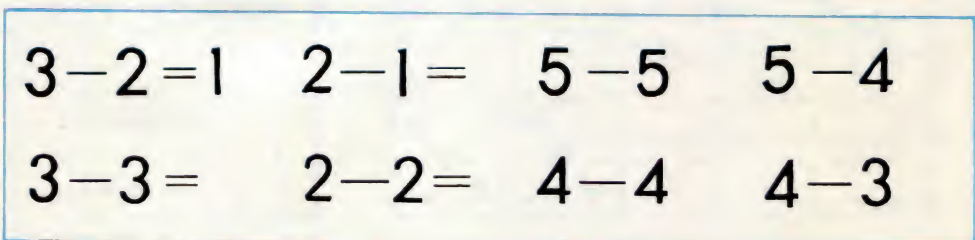
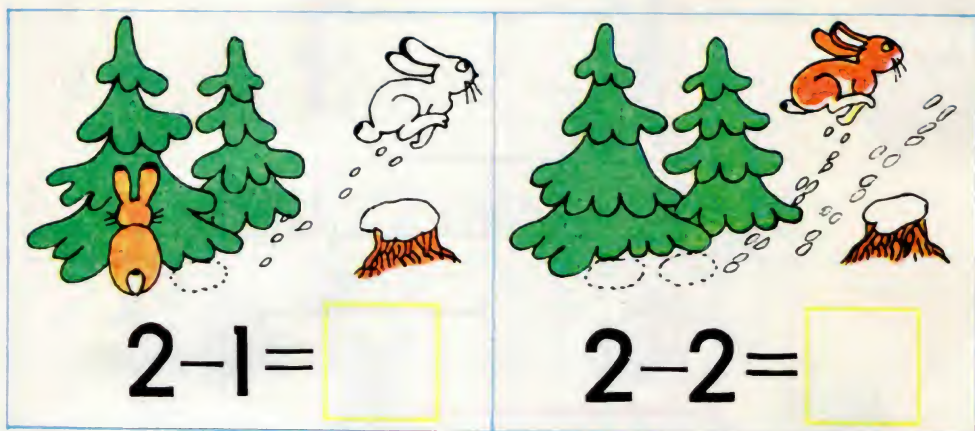
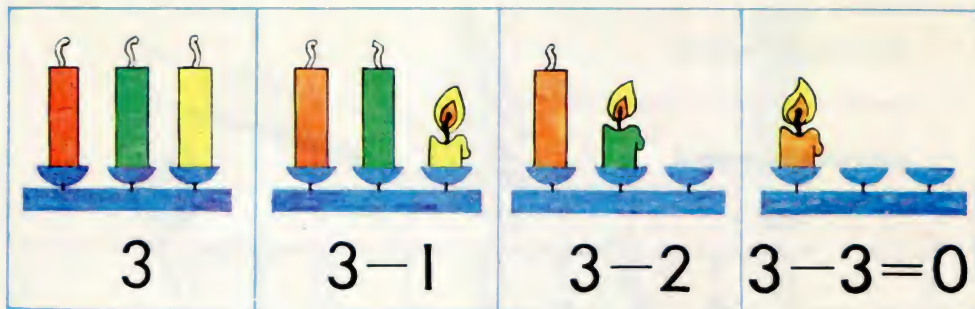
$$4 > \blacklozenge \bullet < \bullet$$



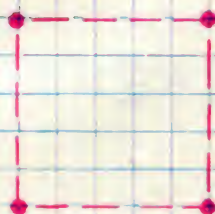
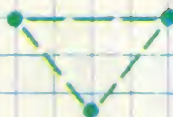
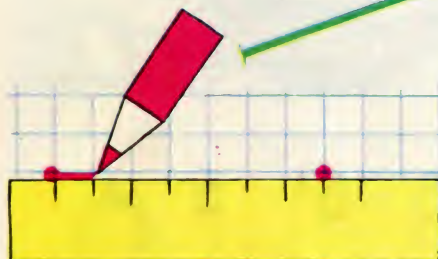
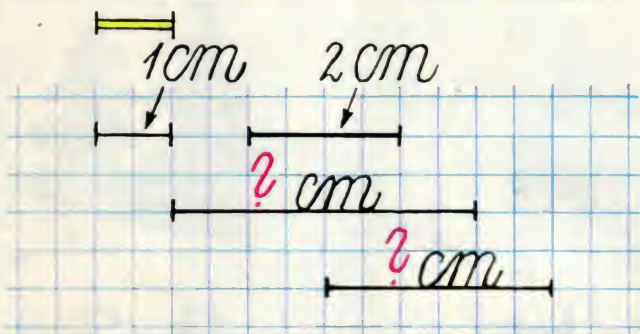
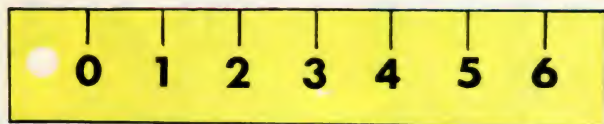


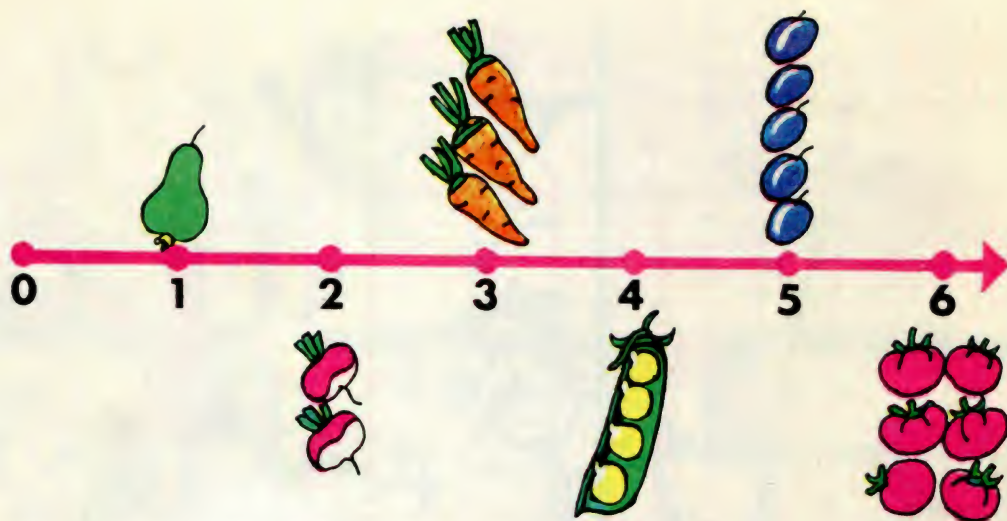
0

0	0	0	1	>	0
+	+	+	=	=	









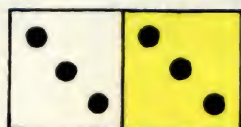
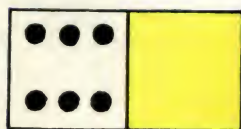
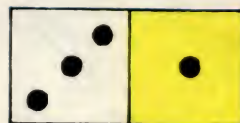
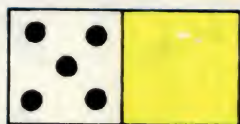
$$0 < 1 < 2 < 3 < 4 < 5 < 6$$



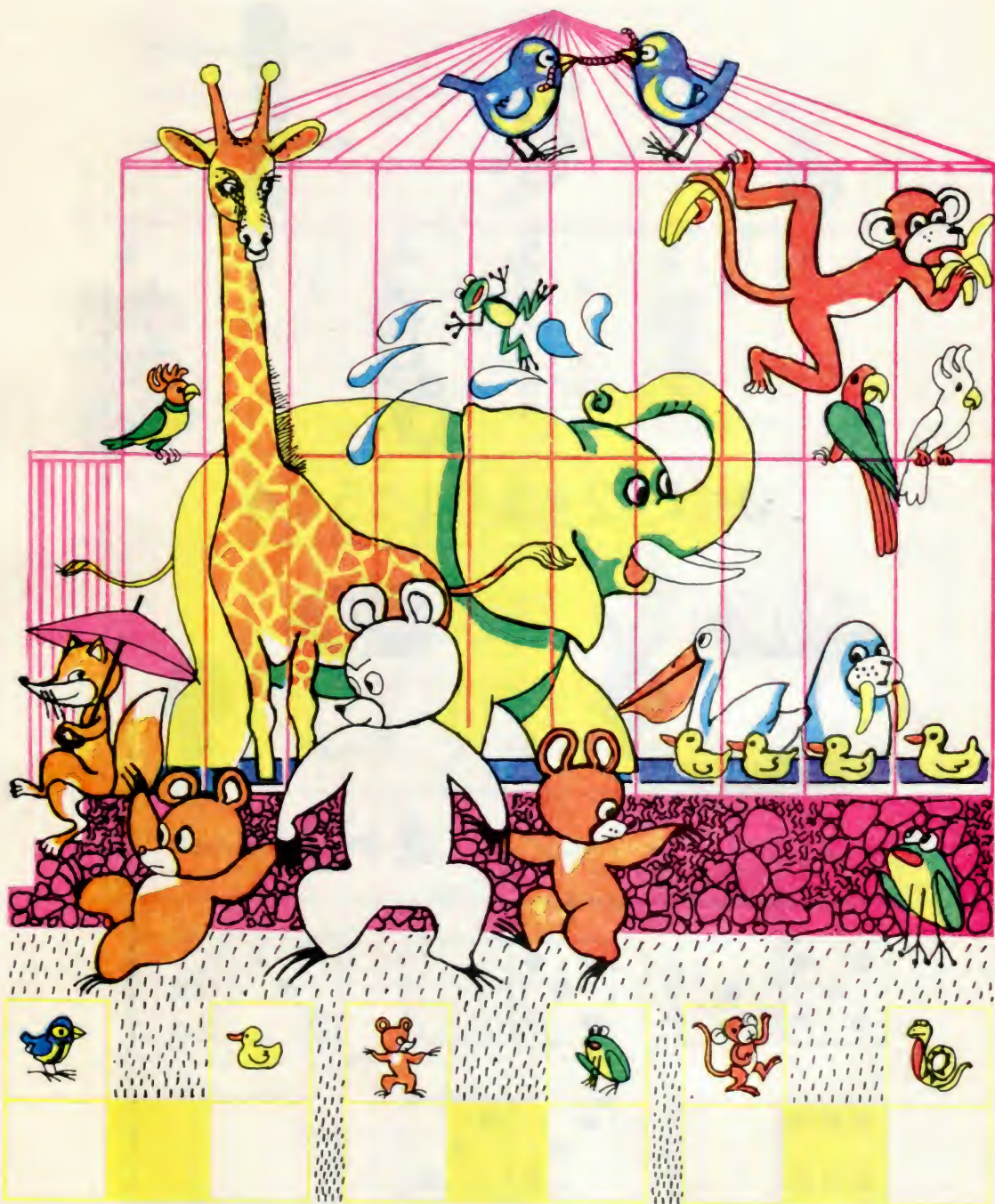
$$4 + 1 = \square$$



$$4 + 0 = \square$$

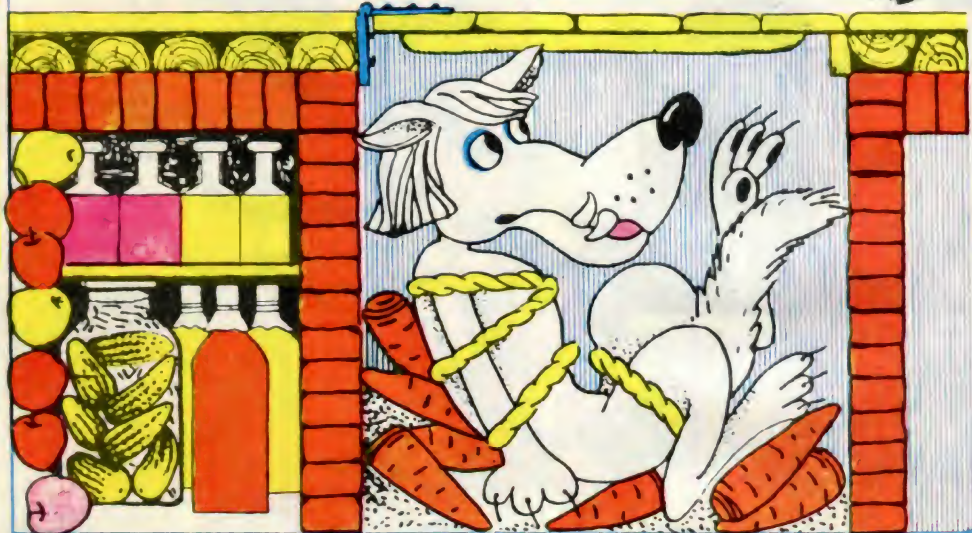










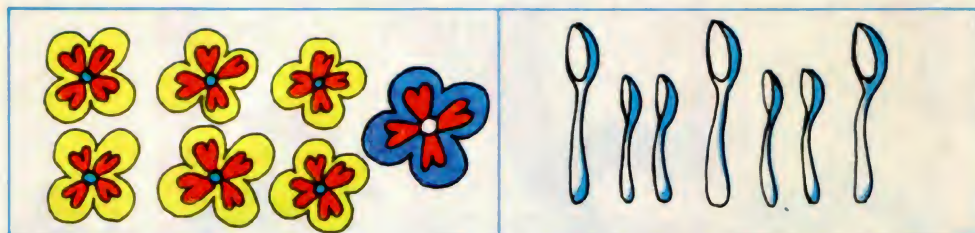
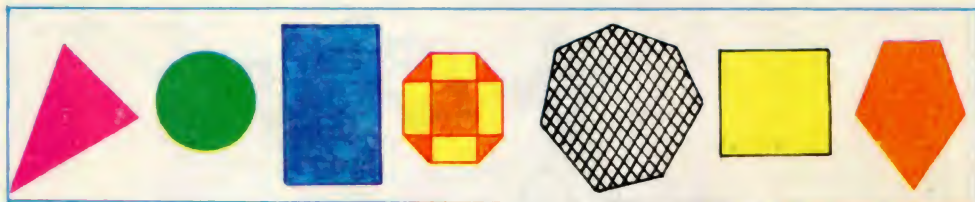


7



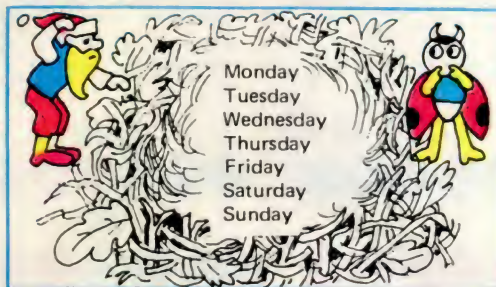
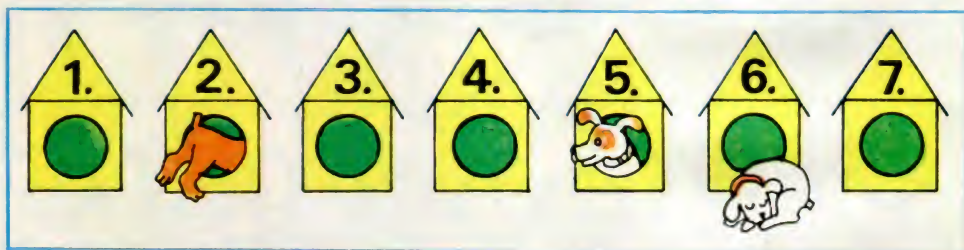
7 7 7 □ △

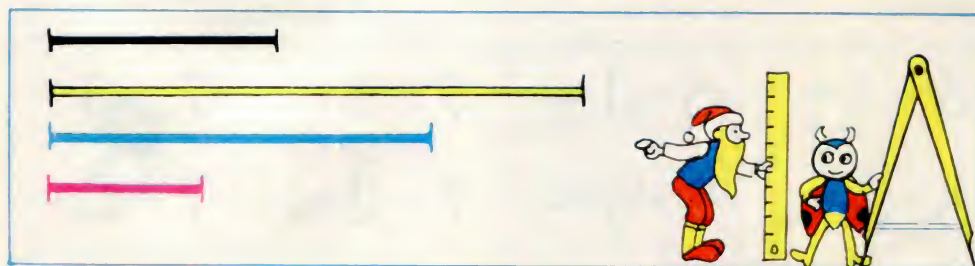
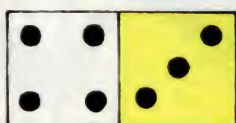
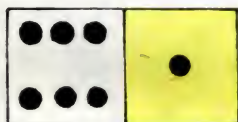
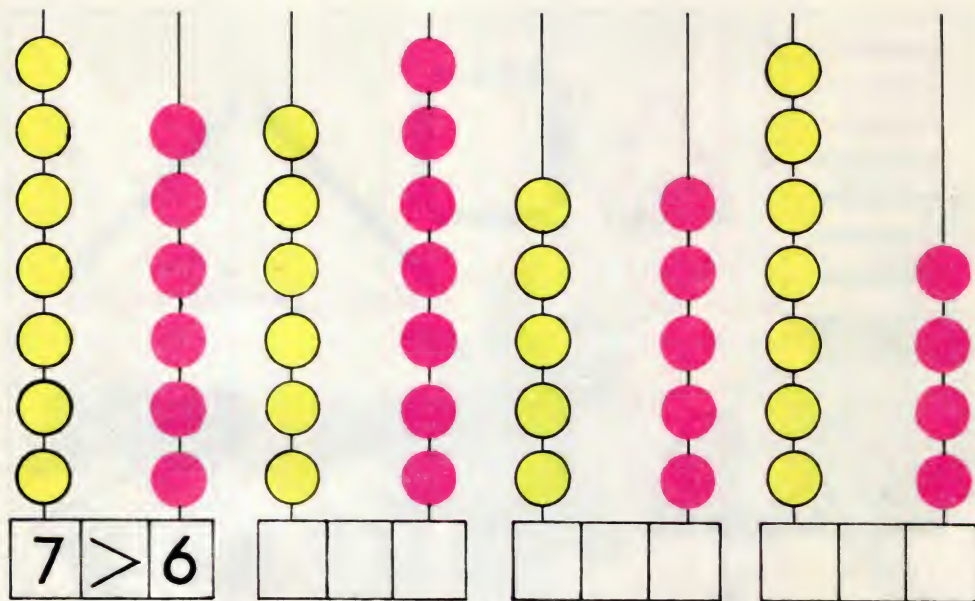
 $7 > 6$        $6 + 1 = 7$



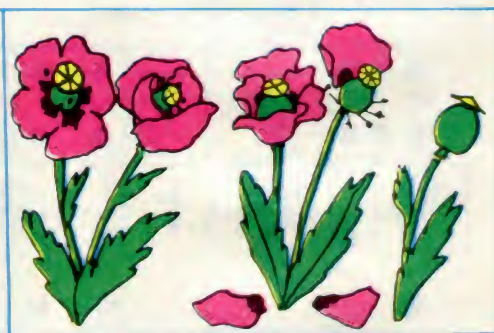
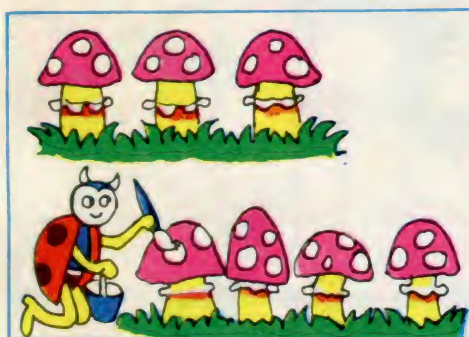
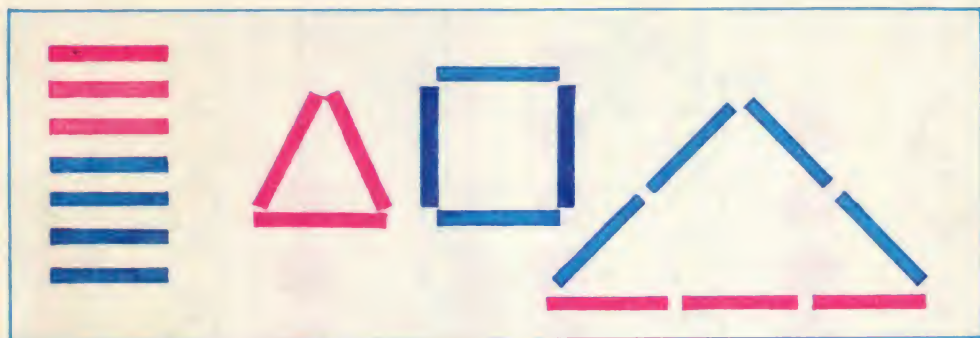
$$7 = 5 + 2$$











$6+1=$	$5+1=$	$7-1=$	$7+0=$
$6-1=$	$5-1=$	$7-2=$	$7-0=$



8



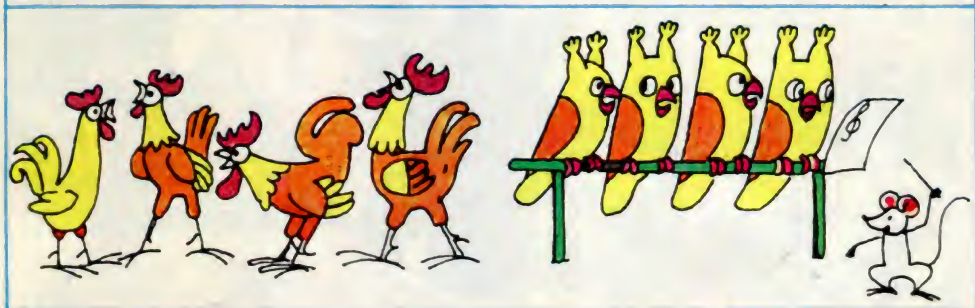
8 8 8



$7 + 1 = 8$

$8 > 7$





$$1 + 7 = 8$$

$$8 = 7 + 1$$

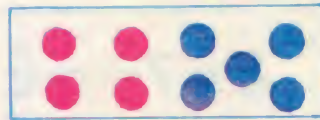
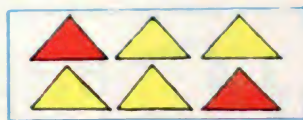
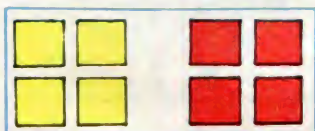
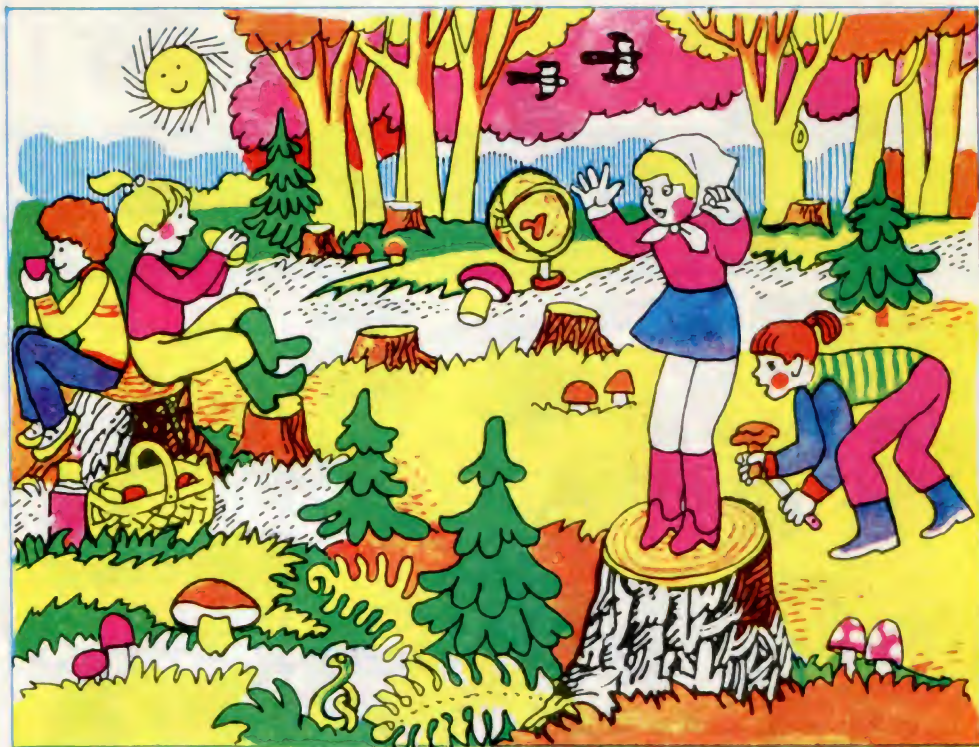
$$8 = 4 + \dots$$

$$8 = 5 + \dots$$

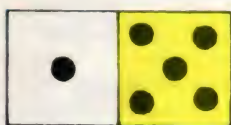
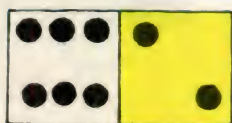
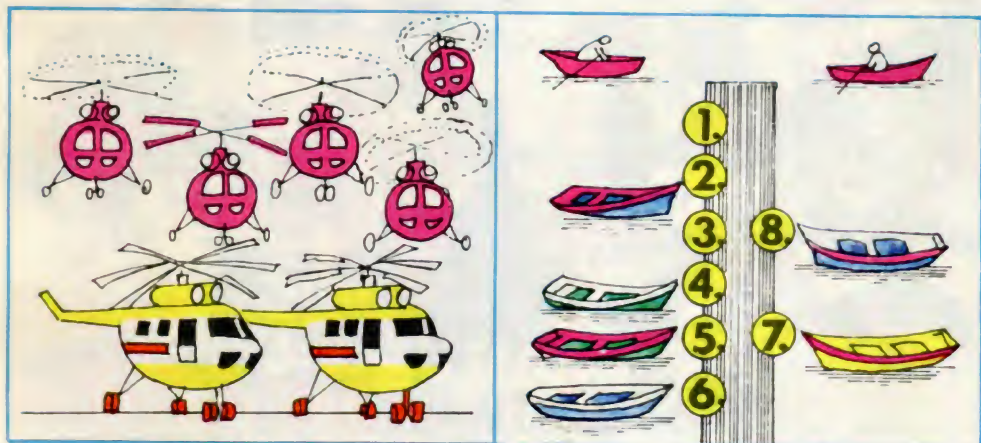
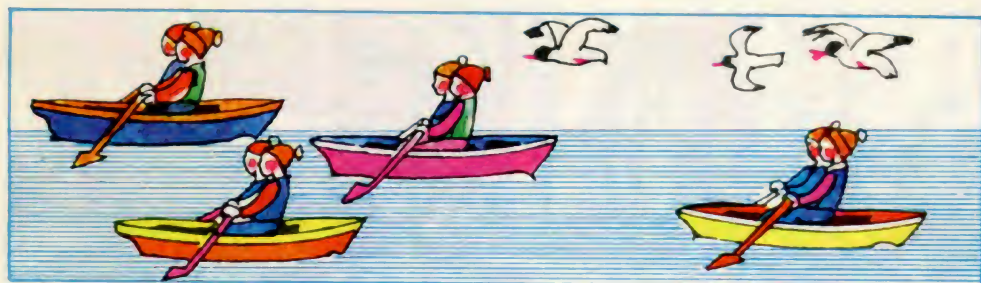
$$8 = 2 + \dots$$

$$8 = 3 + \dots$$

$$8 = 6 + \dots$$







$$8 > 7$$

$$8 \dots 4$$

$$8 \dots 1$$

$$6 \dots 8$$

$$7 \dots 8$$

$$5 \dots 8$$

$$2 \dots 8$$

$$8 \dots 8$$

1	2		4		6		8
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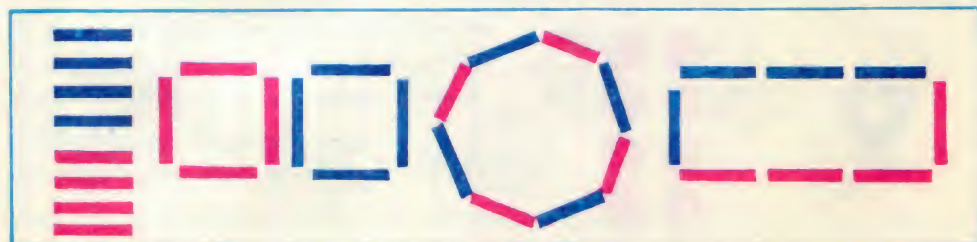
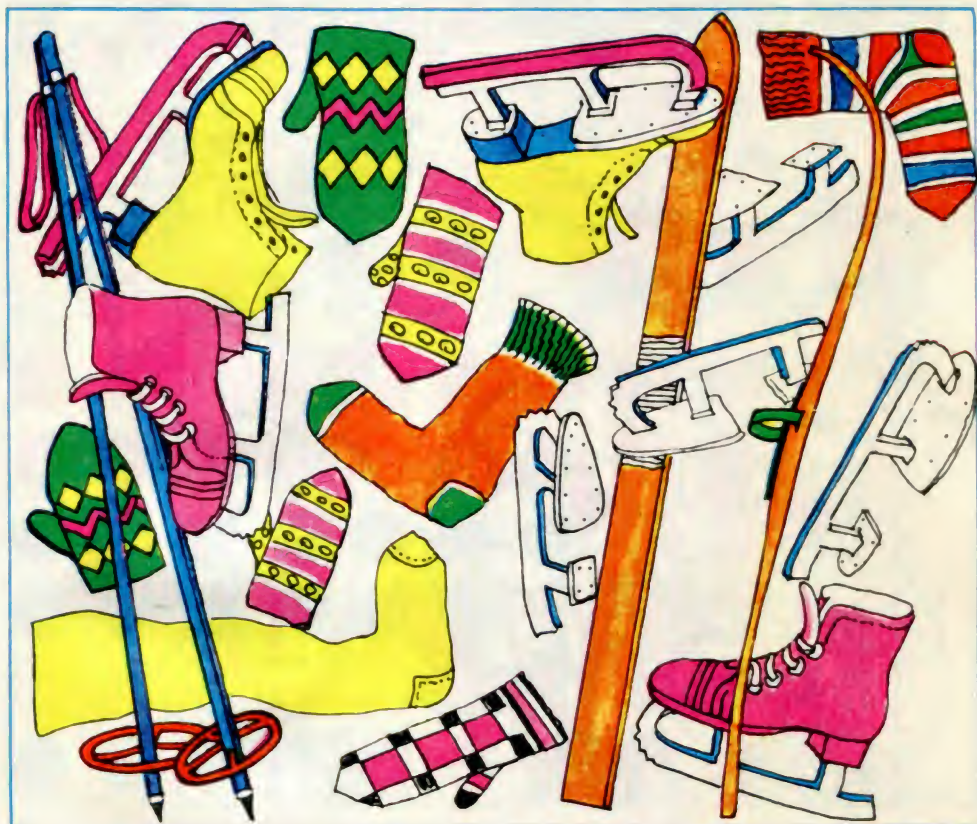
▲	3	★
---	---	---

▲	5	■
---	---	---

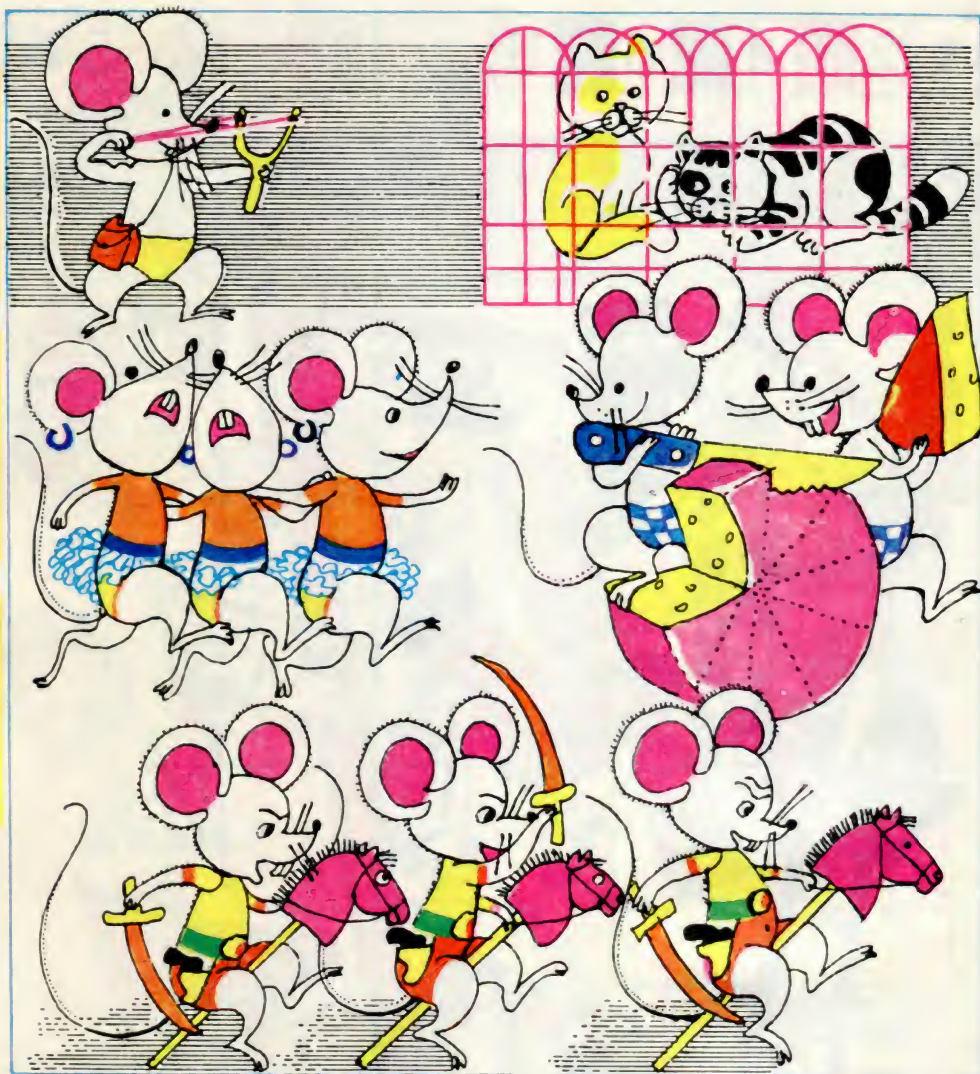
8	7		5		3		1
---	---	--	---	--	---	--	---

◆	6	●
---	---	---

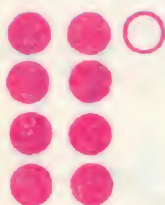
●	1	▲
---	---	---







9

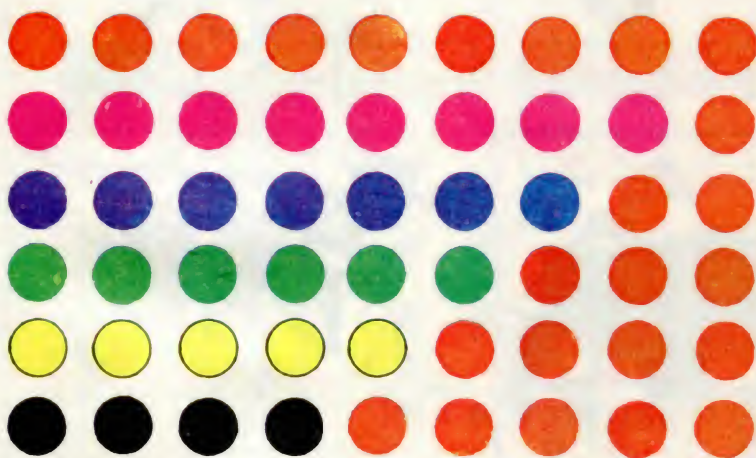
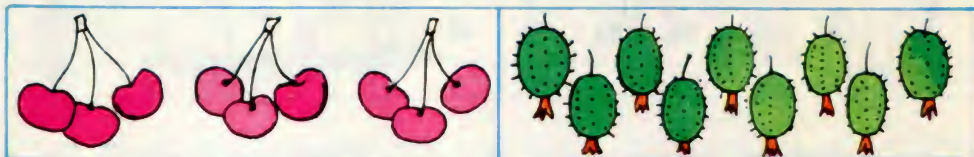


9 9 9

$\triangle \triangle \triangle$

$8 + 1 = 9$

$9 > 8$

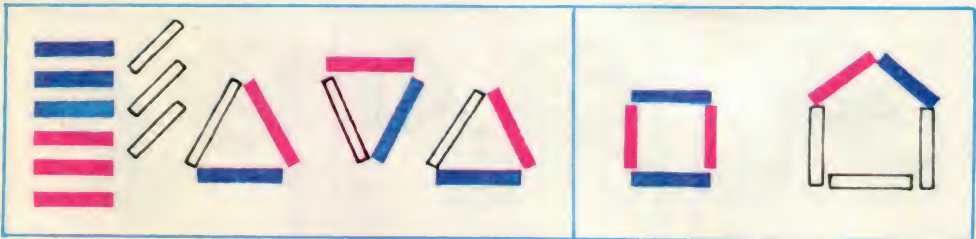
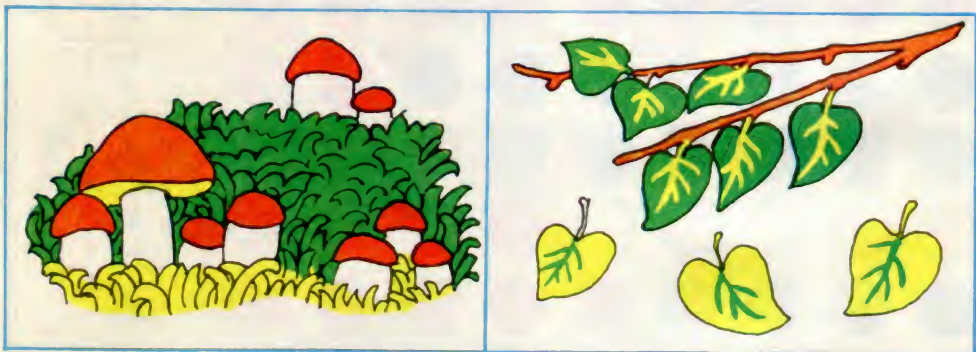
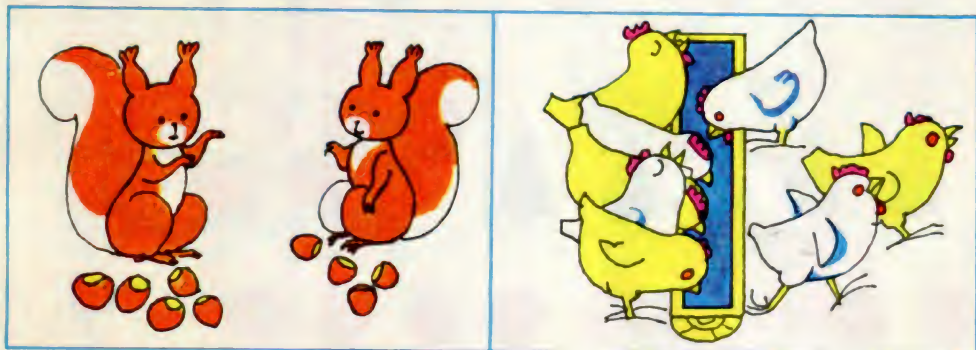
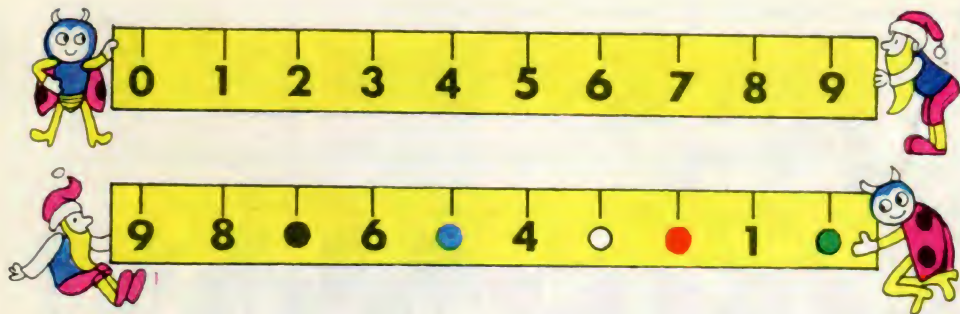


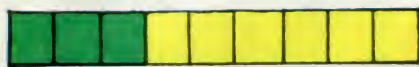
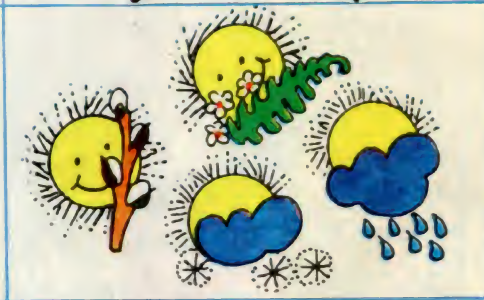
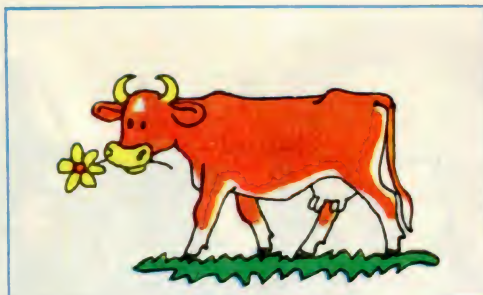
9

8	1
7	
6	3
5	
4	

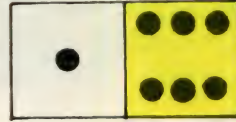
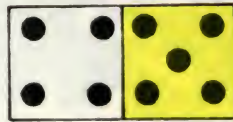
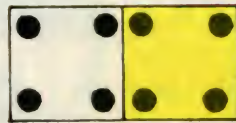
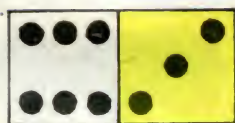








$$9 = 3 + 6$$



$$7 < 6$$

$$7 \dots 5$$

$$3 \dots 3$$

$$6 \dots 9$$

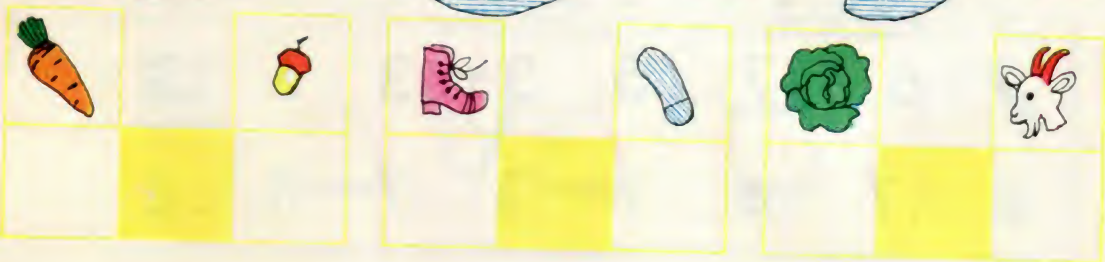
$$6 \dots 7$$

$$4 \dots 7$$

$$3 \dots 7$$

$$8 \dots 8$$







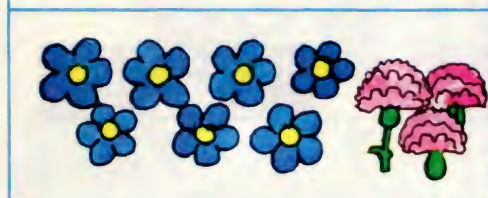
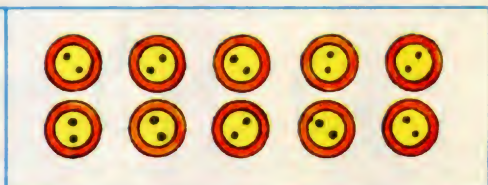
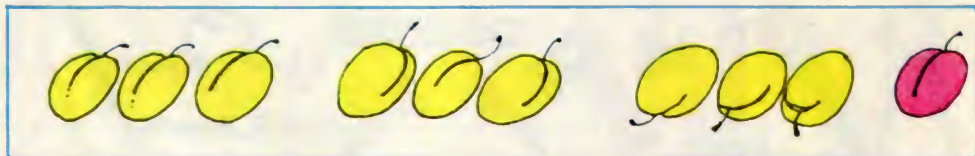




10



10	10	10	10
$9 + 1 = 10$	$10 > 9$		

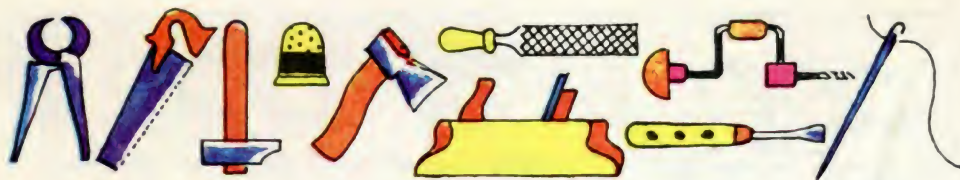


10	9		7	6	5		3	2	
	1	2	3			6		8	9

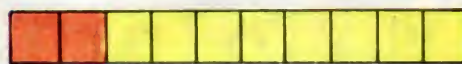
$$8+1= \quad 7+2= \quad 9+1= \quad 10-1=$$

$$8-1= \quad 7-2= \quad 9-1= \quad 10-9=$$





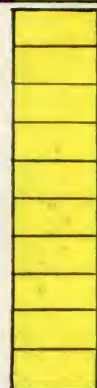
$$10 = 5 + 5$$



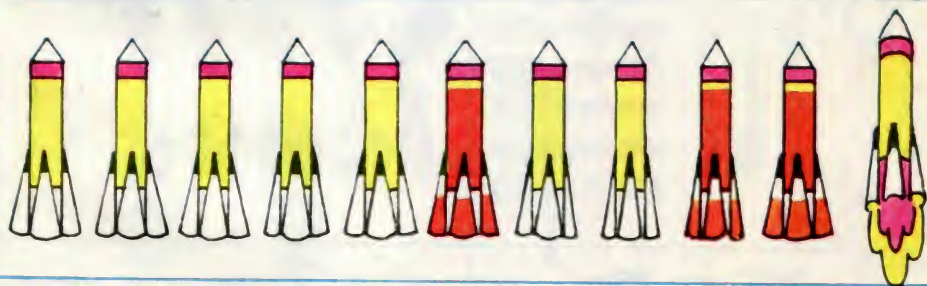
1...3...5...7...9  
 ...9...7...5...3...1



1 2 3 4 5 6 7 8 9 10

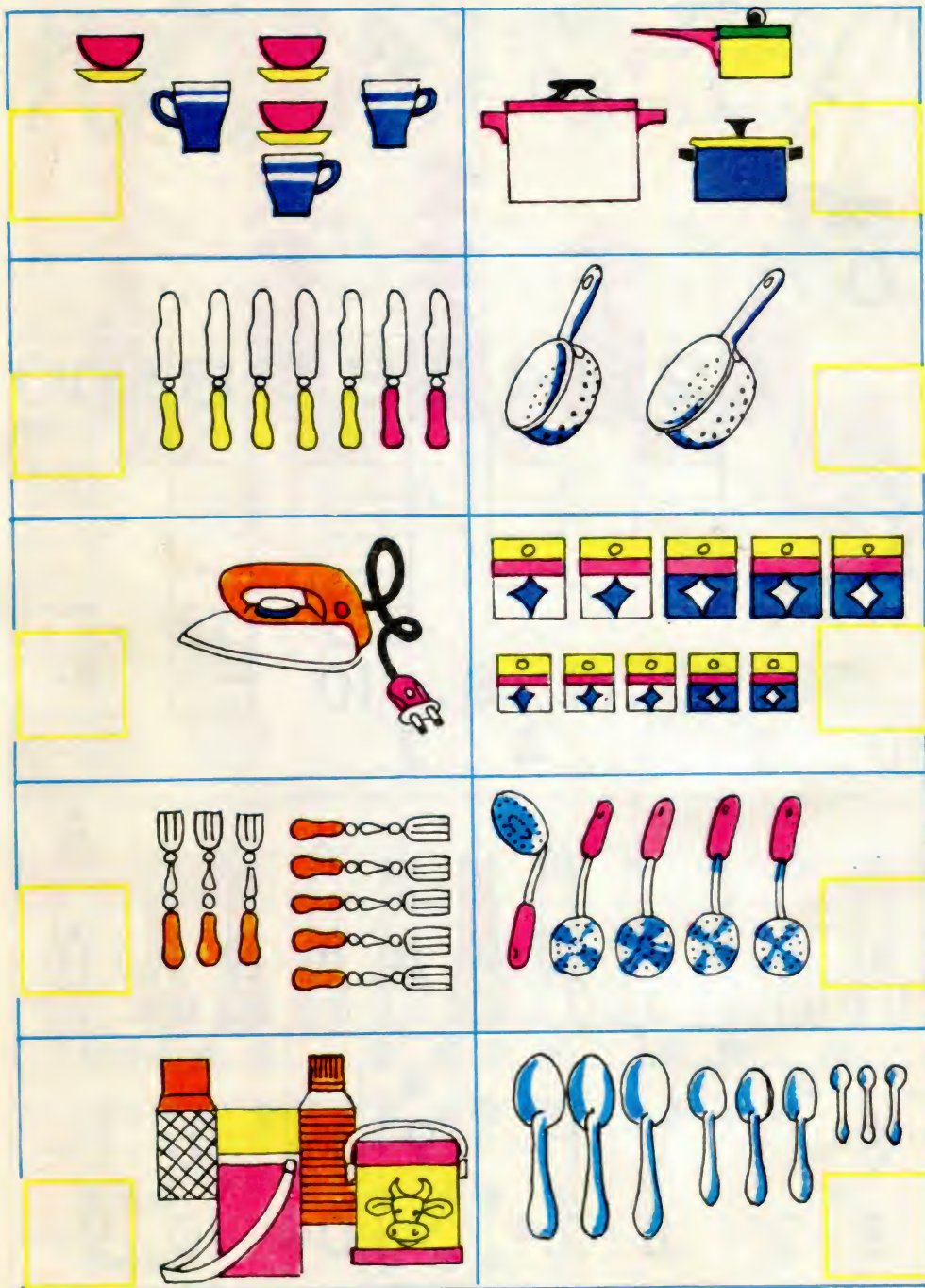


...2...4...6...8...10  
 10...8...6...4...2...



$$\begin{array}{llll} 8-1= & 8+1= & 9+1= & 10-1= \\ 8-2= & 8+2= & 9+0= & 10-9= \end{array}$$







7

8

9

10

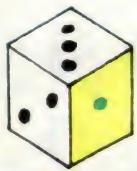
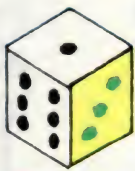
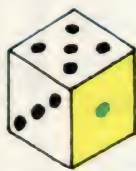
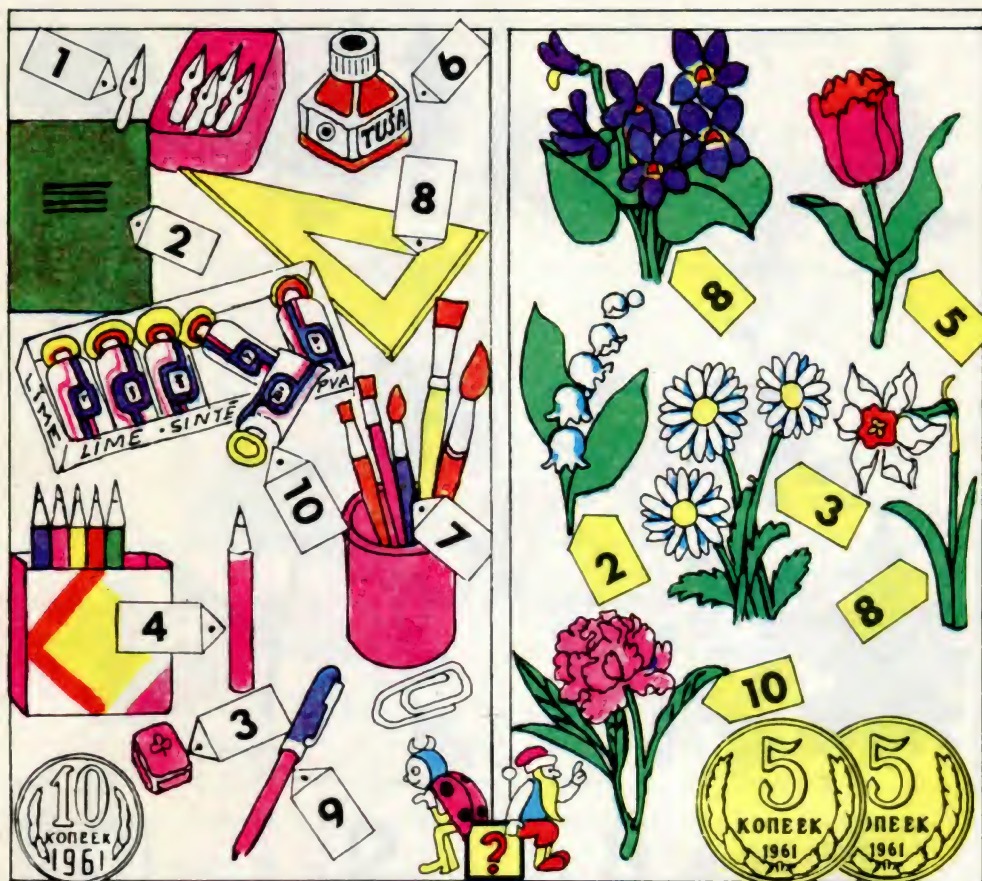
5	
	3
	4
1	

	7
2	
5	
	4

2	
1	
	3
	5

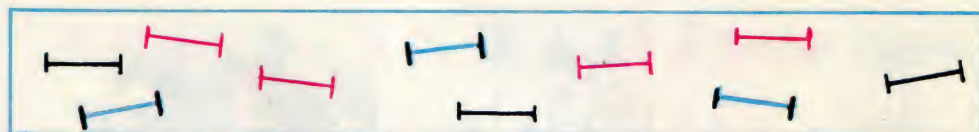
	5
	2
3	
4	





$$10 = 1 + \square \quad 10 = 3 + \square \quad 10 = 5 + \square$$

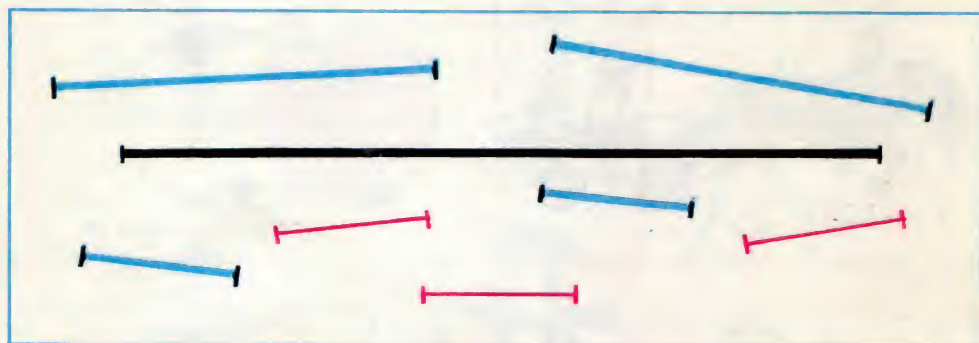
$$10 = 2 + \square \quad 10 = 4 + \square \quad 10 = 10 + \square$$



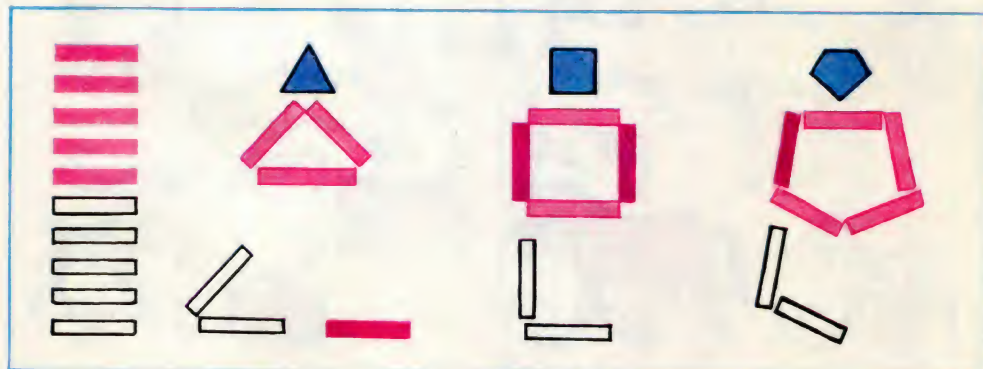
0 1 2 3 4 5 6 7 8 9 10



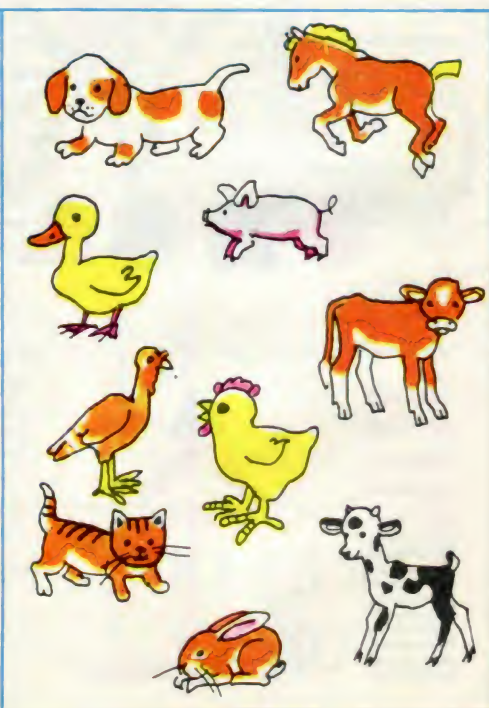
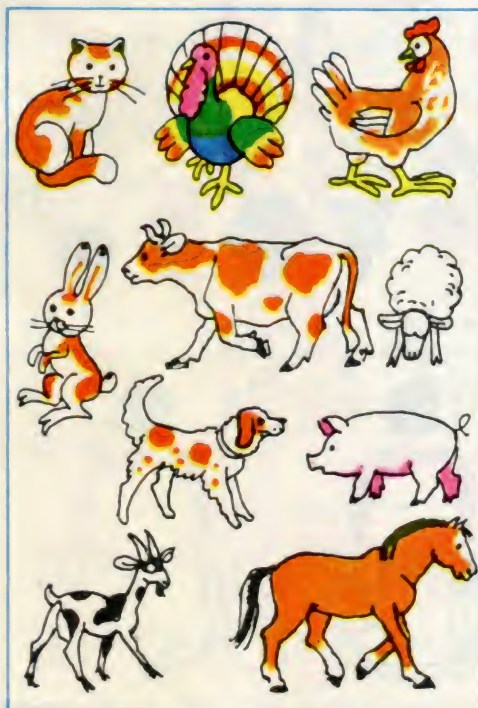
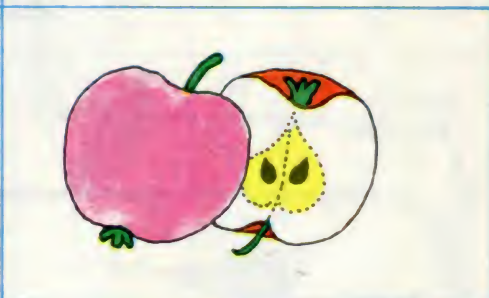
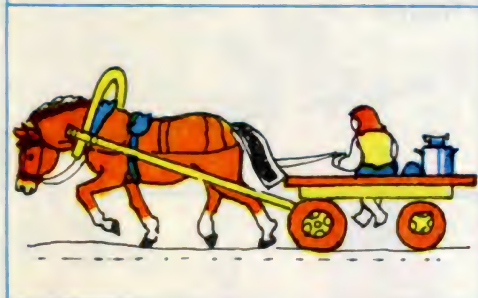
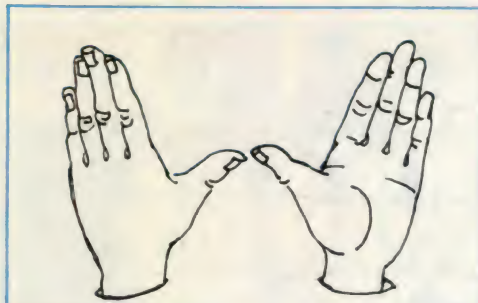
1 decimetre



1. 2. 3. 4. 5. 6. 7. 8. 9. 10.









$$3+1=4$$



$$7+1$$

$$6+1$$

$$2+2$$

$$5+2$$

$$4+2$$

$$1+1$$

$$6+2$$

$$9+1$$

$$5+1$$

$$1+3$$

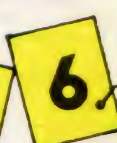
$$8+1$$

$$9+3$$

$$3+2=$$



$$7-1=$$



$$5-3=2$$



$$5-1$$

$$3-2$$

$$6-2$$

$$9-1$$

$$4-1$$

$$2-1$$

$$6-1$$

$$10-1$$

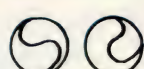
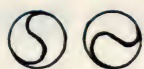
$$3-1$$

$$2-2$$

$$8-1$$

$$10-2$$

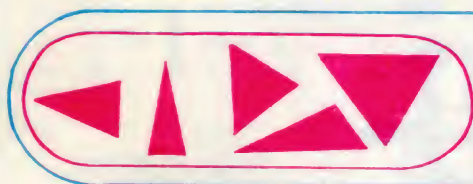




$$2 + 3 = 3 + 2$$



$$\square + \square = \square + \square$$



$$5 + 4 = 4 + 5$$



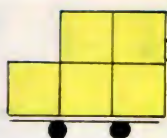
$$6 + 3 = 9 \quad 3 + 6 = \dots \quad 2 + 5 = \dots \quad 5 + 2 = \dots$$

$$5 + 1 \quad 7 + 2 \quad 2 + 3 \quad 8 + 1 \quad 3 + 3$$

$$1 + 5 \quad 2 + 7 \quad 3 + 2 \quad 1 + 8 \quad 4 + 4$$



$$5 + 1 = 6$$



$$1 + 5 = 6$$



$$9 + 1$$

$$7 + 3$$

$$2 + \dots$$

$$\dots + 6$$

10

$$6 + 4$$

$$8 + 2$$

$$3 + \dots$$

$$1 + \dots$$

$$8 + 1 = \dots$$

$$7 + 2 = \dots$$

$$6 + 4 = \dots$$

$$9 - 1 = \dots$$

$$9 - 2 = \dots$$

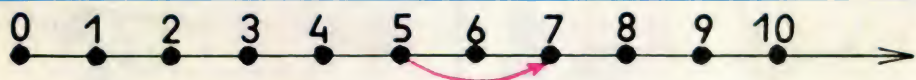
$$10 - 4 = \dots$$

$$9 - 8 = \dots$$

$$9 - 7 = \dots$$

$$10 - 6 = \dots$$

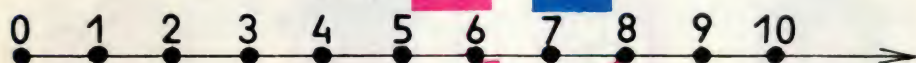




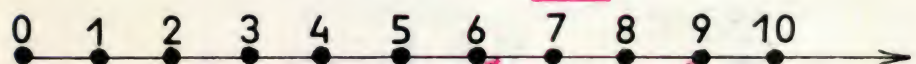
$$5 + 2 = 7$$



$$4 + \square = \square$$



$$8 - 2 = 6$$



$$9 - \square = \square$$



$$4 + \square = 6$$

$$\square + 2 = 6$$

$$\square + \square = 6$$

$$4 + 2 = \square$$

$$\square + \square = \square$$

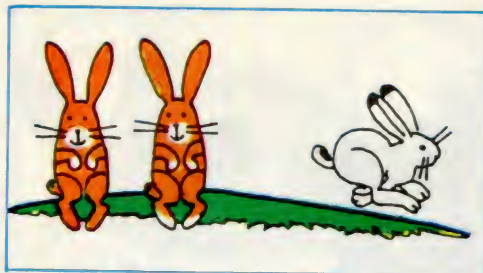
$$5 - \square = 4$$

$$\square - 1 = 4$$

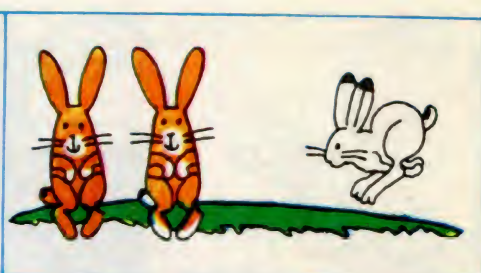
$$\square - \square = 4$$

$$5 - 1 = \square$$

$$\square - \square = \square$$



$$3 - 1 = 2$$



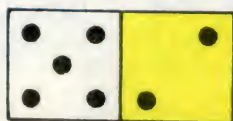
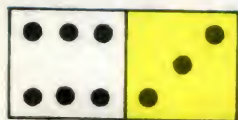
$$2 + 1 = 3$$



$$4 + 3 = 7$$

$$7 - 3 = \dots$$

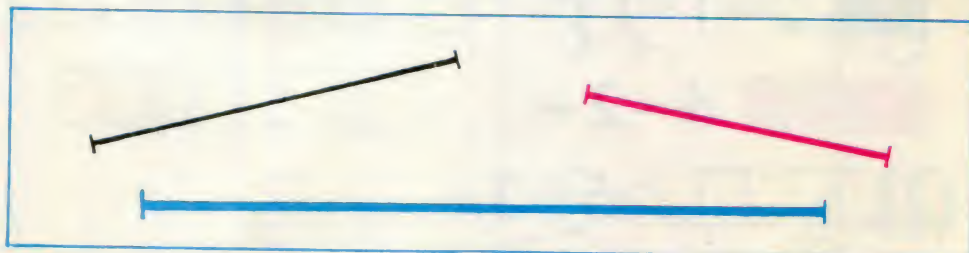
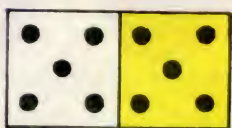
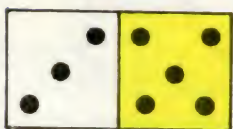
$$7 - 4 = \dots$$



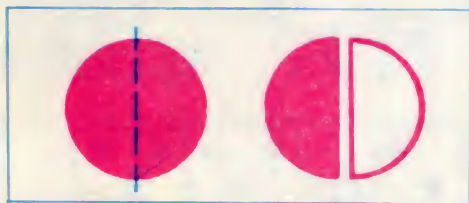
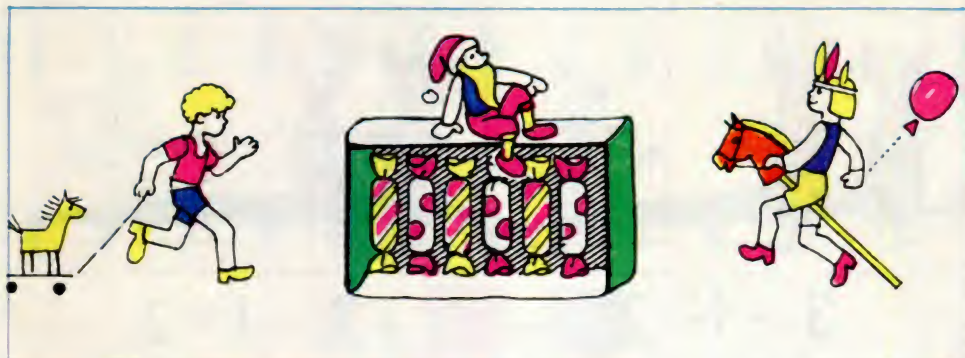
$$6 + 3 = 9$$

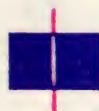
$$9 - 3 = \dots$$

$$9 - 6 = \dots$$



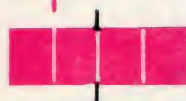







$$2 = 1 + 1$$



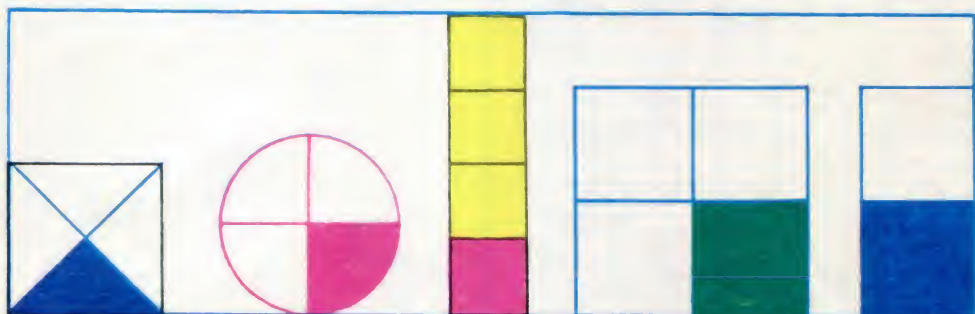
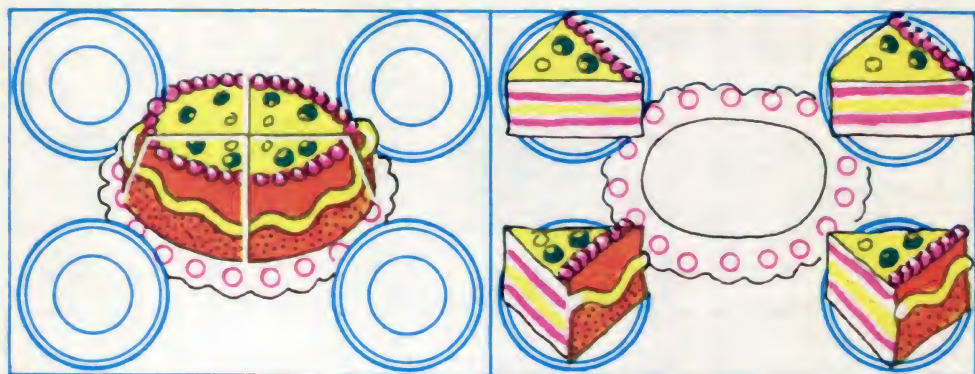


$$4 = 2 + \dots$$





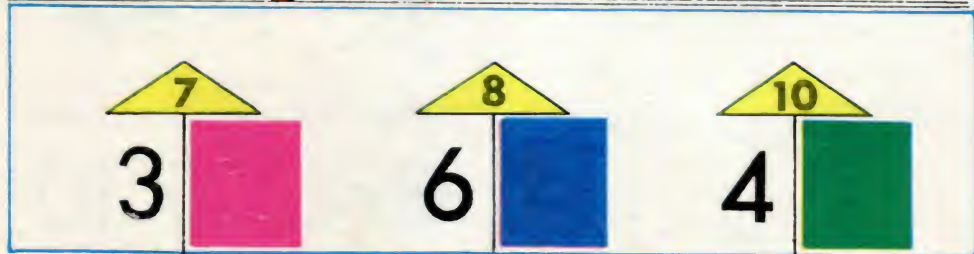
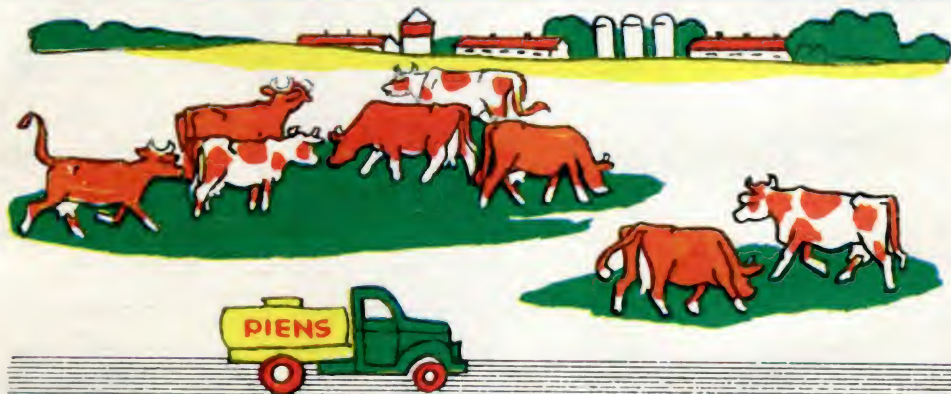
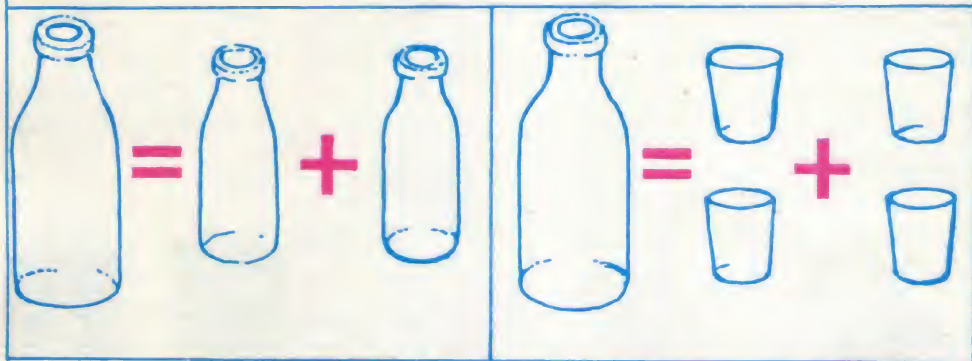
$$6 = 3 + \dots$$

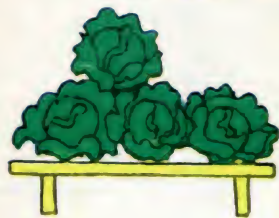


4	7	5	6	8
2	3	1	0	2
?	?	?	?	?

2 < ? < 5	3 < <input type="text"/> < 6
2 < 3 < 5	5 < <input type="text"/> < 10
2 < 4 < 5	







$$4 + 1 + 1$$



$$5 + 1 + 1 + 1 = 8$$

$$4 + 1 + 1 =$$

$$6 + 2$$

$$8 + 2$$

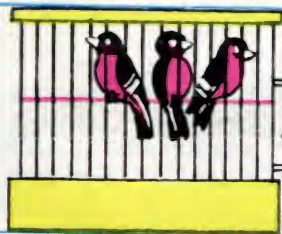
$$6 + 3$$

$$4 + 2 =$$

$$3 + 2$$

$$7 + 3$$

$$5 + 2$$



$$5 - 1 - 1$$



$$7 - 1 - 1 - 1 = 4$$

$$4 - 1 - 1 =$$

$$9 - 2$$

$$8 - 3$$

$$10 - 3$$

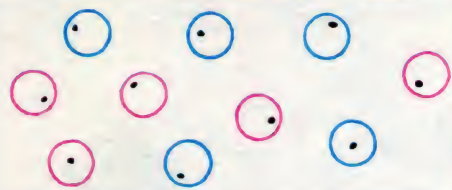

$$4 - 2 =$$





$$7 - 2$$

$$10 - 2$$



$$6 - 1$$









	
ten ones are one ten	

	
 $10 + 1 = 11$	 $10 + 2 = 12$
eleven	twelve

					
13	15	...	...	...	...

	
$19 = 10 + 9$	$20 = 10 + 10$
nineteen	twenty

11	12	13					18	19	20
----	----	----	---	---	---	---	----	----	----

 	 	 
$10 + 1 = 11$ $11 - 1 =$ $11 - 10 =$	$10 + 5$ $15 - 5$ $15 - 10$	$10 + 10 = 20$ $20 - 10 =$

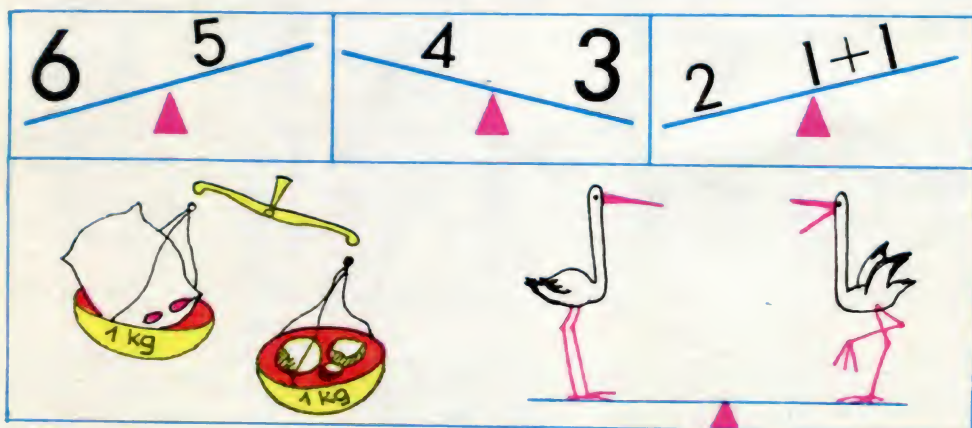
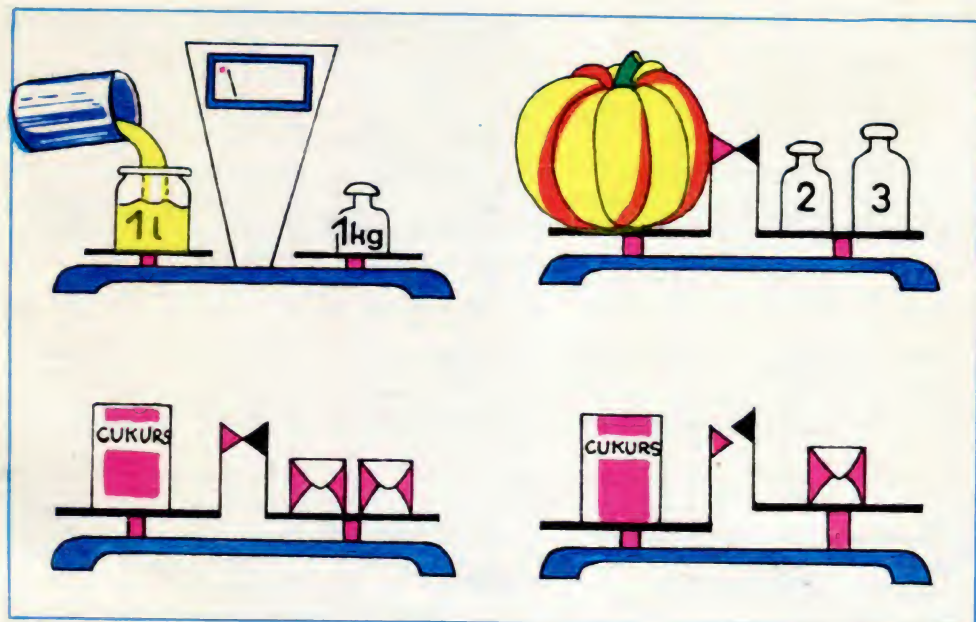


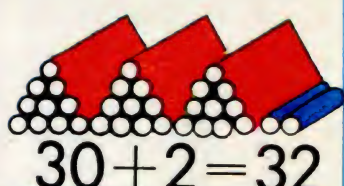
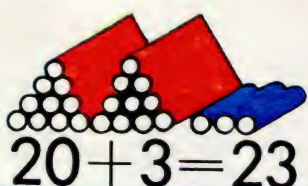
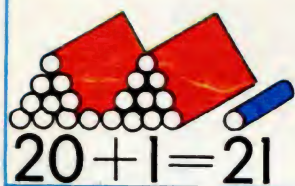
$10 + 1$	$14 - 1$	$17 + 1$	$18 - 1$
$11 + 1$	$15 - 1$	$18 + 1$	$19 - 1$
$12 + 1$	$16 - 1$	$19 + 1$	$20 - 1$



$10 + 3 = 13$	$13 - 3 = 10$	$13 - 10 = 3$
---------------	---------------	---------------







$$70 + 7 = 77$$



$$90 + 9 = 99$$

$$10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 = 100$$

$$99 + 1 = 100$$

$$100 - 1 = 99$$

$$35 + 1$$

$$78 - 1$$

$$29 + 1$$

$$90 - 1$$

$$62 + 1$$

$$98 - 1$$

$$59 + 1$$

$$70 - 1$$

$$48 + 1$$

$$36 - 1$$

$$99 + 1$$

$$30 - 1$$





$$23 = 20 + 3$$



$$42 = \dots + \dots$$



$$3 + 4$$

$$7 - 3$$

$$7 - 4$$

$$30 + 40 \quad 70 - 30 \quad 70 - 40$$



$$40 + 1$$



$$30 + 6$$

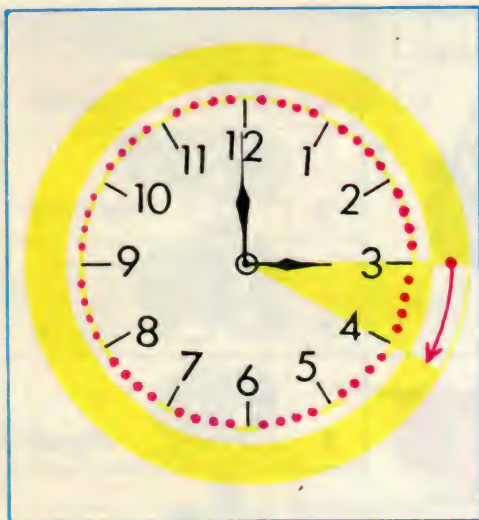


$$20 + 10$$



<p>23rd February</p> 	<p>8th March</p> 	<p>1.  January</p>
		<p>2.  February</p>
		<p>3.  March</p>
 <p>12th April</p>	 <p>1st and 2nd May</p>	<p>4.  April</p>
		<p>5.  May</p>
		<p>6.  June</p>
<p>21st July</p> 	 <p>1st September</p>	<p>7.  July</p>
		<p>8.  August</p>
		<p>9.  September</p>
 <p>7th October</p>	<p>7th and 8th November</p> <p><b>1917</b></p> 	<p>10.  October</p>
		<p>11.  November</p>
		<p>12.  December</p>





$$6 + 1$$

$$5 + 3$$

$$5 + 2$$

$$4 + 3$$

$$7 - 3$$

$$8 - 3$$

$$9 - 0$$

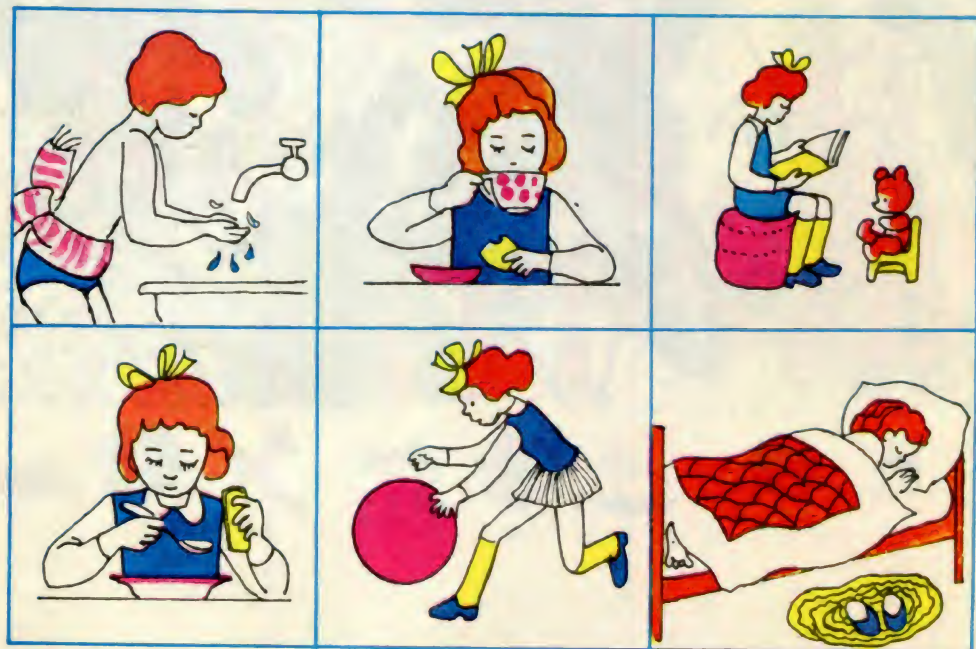
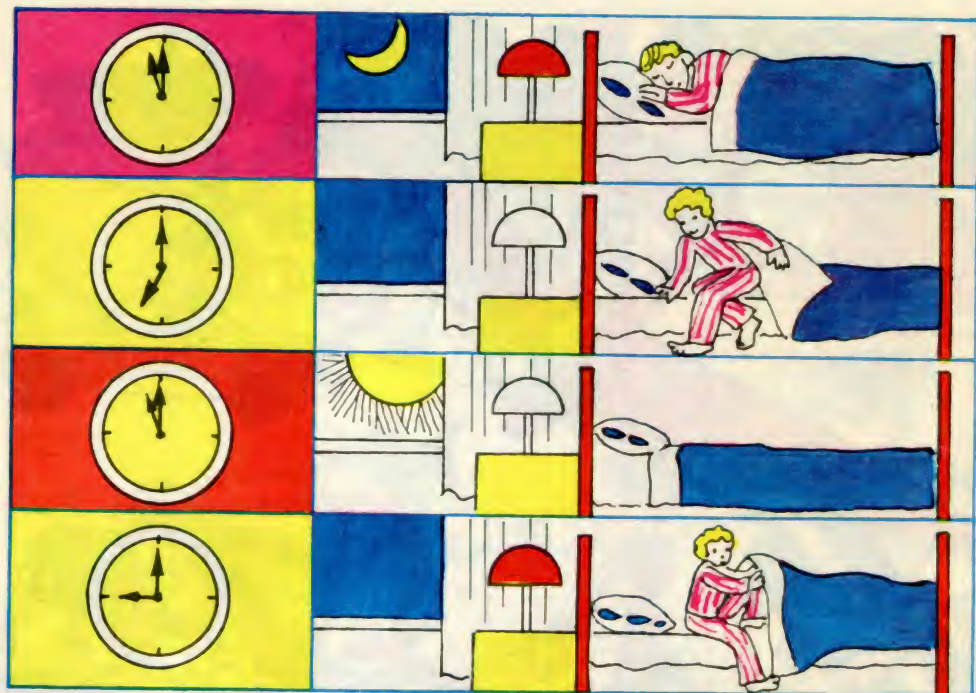
$$9 - 1$$

$$2 + 2$$

$$9 + 1$$

$$7 - 0$$

$$5 + 0$$









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--	--

--	--





7.

8.

9.

$5 + 2$

$1 + 4$

$3 + 3$

$9 - 2$

$7 - 0$

$8 - 2$

$9 - 4$

$8 + 1$

10.  $9 - 6$        $8 + 0$   
 $3 + 7$        $9 - 8$   
 $7 - 7$        $6 + 4$   
 $4 + 5$        $5 - 0$

11.

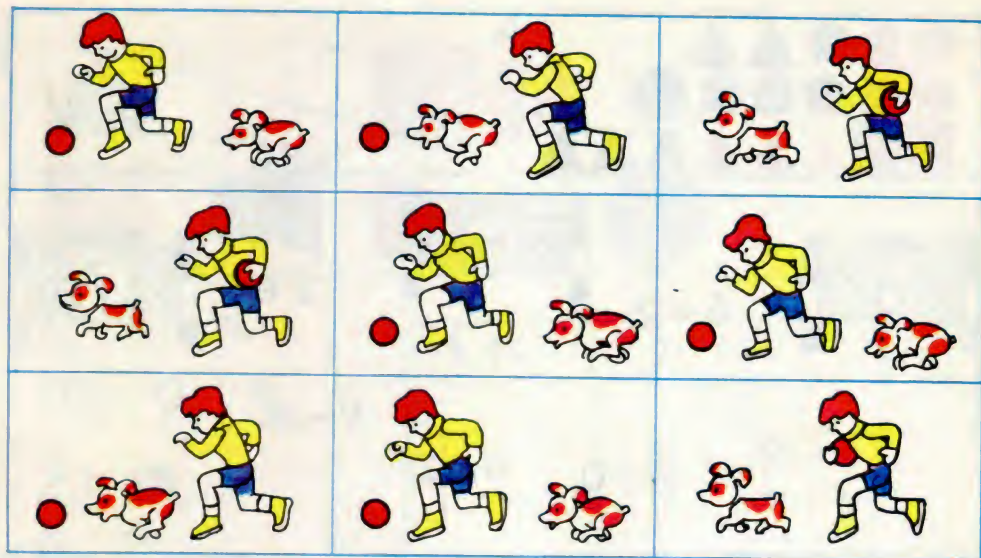
12. Were (One had)

(One) bought

Was left?

13.  $5 + 4$        $3 + 5$        $10 - 1$        $4 + 2 + 1$   
 $6 - 2$        $9 - 8$        $8 + 2$        $6 + 1 + 3$   
 $9 + 1$        $7 + 1$        $10 - 5$        $9 - 2 - 1$





100	99	98	97	96	95	94	93	92	91
81	82	83	84	85	86	87	88	89	90
80	79	78	77	76	75	74	73	72	71
61	62	63	64	65	66	67	68	69	70
60	59	58	57	56	55	54	53	52	51
41	42	43	44	45	46	47	48	49	50
40	39	38	37	36	35	34	33	32	31
21	22	23	24	25	26	27	28	29	30
20	19	18	17	16	15	14	13	12	11
1	2	3	4	5	6	7	8	9	10



## INSTRUCTIONS

Development of elementary mathematical notions is one of the main tasks in the intellectual education of children and their preparation for school. Therefore it is of utmost importance how the first contact of children takes place with mathematics — a subject forming one of the cornerstones of knowledge.

At the age of five or six children have already formed their views and their judgements about the surroundings they live in. The closer the road to mathematics will be to the world explored and felt by themselves, the more fascinating it will seem. Up to that time the child is used to perceive everything concretely — a concrete tree, a concrete house, concrete sweets, concrete people, etc. Now time has come to learn to generalize, enlarge and systematize the earliest notions. It is time to get acquainted with new notions and abstract symbols, new actions should be mastered and a new — mathematical shade is to be added to the first notions and habitual activities. And it is by no means so simple. It is not easy for the children to comprehend what a number is and how a sum or difference is formed which unlike a pencil or apple cannot be taken into one's hand nor put into the pocket. It is their first encounter with abstract symbols (numbers) and abstract operations (operations with those). The school as such with its unaccustomed order and discipline is also something new. The strange surroundings embarrass and excite, but they also arouse interest. It is this interest, the wish to listen to and understand all the unusual that is the best aid to the grown-ups opening up the road for children to the world of mathematics. Thus, the key to future success lies in carefully devised and skilfully organized classes with particular importance attached to successfully chosen methods of work and appropriate teaching aids.

The book «First Steps in Mathematics» can be regarded as one of the teaching aids. It contains not only numbers from 1 to 10 and their designations. The book embraces also material for acquainting children with other mathematical notions and terms. The essential value of the book lies in its manyfaceted and rich illustrative material successively reflecting almost the material provided by mathematics programme for the preparatory class.

The material comprised in the first 15 pages may be conditionally denoted by the words «pre-number mathematics»: it introduces such notions as the size of objects (larger — smaller, broader — narrower, longer — shorter, etc.), location of objects and their placement in space (closer — farther, above — under, to the right — to the left, etc.), the form of objects (round, angular, oval), groups and their comparison (group — sub-group, the same amount, more — less, one — many), the simplest geometrical figures (circle, square, cube, sphere, cone, cylinder).

The introductory part is aimed at teaching the children to make a logical narrative, to establish correspondence between elements of two groups, to acquaint them with the simplest elements of classification, analysis and synthesis.

Beginning with page 16 numbers 1 to 10 are gradually dealt with as well as their corresponding figures. When examining separate numbers their composition is explained, the children are made acquainted with the gradual formation of the natural row of numbers, comparison of numbers (also making use of the signs  $>$ ,  $<$ ,  $=$ ). After numbers 5 and 6 the ordinal numerals have been introduced, adding and subtraction operations. Simultaneously with the arithmetical material children get ideas about the basical notions of geometry, they learn to measure and compare cuts of various length.

Some of the last pages of the book are devoted to the introduction of numerals from 11 to 100, without dealing with operations with them. Here the first notions about various



units of amounts have been given (decimetre, litre, kilogram, 24 hours, a month). Various illustrations show how a whole can be divided into equal parts, thus clarifying such notions as «a half», «a fourth», «a third».

The book also features examples to be written in the network of squares. It is advisable to make the children copy those in their notebooks.

Of wide and many-sided use is the enclosure of the book consisting of six sets of didactic distribution material for independent work. The illustrative material should be correspondingly cut and placed into envelopes (even better if the sets can be kept in special boxes). Here are a few suggestions for work with each of the mentioned sets.

**Coloured strips.** Their length (in centimetres) is from 1 to 10 (for some strips — up to 12). The strips are meant to be used in drills concerning the composition of numbers, when comparing numbers and consolidating the skills of addition and subtraction. Thus, for instance, examining number 8, the child places strip (number!) 8 on the table and by shorter strips (numbers!) near it or on it, makes it clear that 8 consists of 5 and 3; of 4 and 4; of 2 and 2, 2 and 2, etc.

Trying, for instance, to define the sum  $4 + 3$ , the child adds strip «3» to the end of strip «4», he tries to arrive at the sum first in his mind, but then checks his judgement (or even establishes the result), by placing strip «7» next to it. Analogous is the operation when defining the difference  $9 - 2$ , which can be illustrated by placing next to (or putting on) «2» to strip «9».

**Squares and circles.** They should be cut into the indicated parts which are used both for composing the figures and consolidation of the notions «a half» and «a fourth».

Compose a square of the 4 green triangles! Compose a square only of 2 green triangles! Make a square of the blue rectangles! Make a rectangle which is not a square! Compose a ring! Show its half! Show its fourth part!

**Capital figures.** These are used by the child «to compose» the given task or the solution of some task. The figures can be used also as «signals» showing by raised hand the answer to the corresponding task.

**Picture cards.** It is desirable that each of the eight series of pictures (10 trees, 10 domestic animals, 10 machines, 10 children, 10 transport vehicles, 10 boats (including a cutter and a raft), 10 agricultural machines) should be cut up and placed into separate envelopes or specially prepared plastic folders. By making use of the cards children learn to compose and solve tasks, to form groups and separate sub-groups of figures, to define the number of elements in the groups, etc.

**Small figures, signs  $>$ ,  $<$ ,  $=$ ,  $+$ ,  $-$  and marks [squares with dots].** They are for the most part meant for working with the pictures of the book, for composing «pictograms», comparing of numbers, addition and subtraction. Everywhere, where there is a vacant square next to the picture in the book (the size of the small figures), the children should be taught to put down the corresponding figures or respective signs.

**Coins.** They can be easily involved in mastering various topics: for drills about the composition of numbers, and when practising addition and subtraction. Children are particularly fond of improvising shopping scenes.

Before giving short notes about the contents of every page of the book the author wants to underline and remind the user that most of the illustrations should be regarded as an intermediary stage between the concrete and the abstract. They are mostly intended to introduce and prepare the children for various practical classes and acquaint them with the new notions. Not necessarily all images should be analysed. It is advisable to analyse the more difficult tasks (pp. 7, 13, 15) later, judging by the standard of children's preparedness. The more relaxed is the style of conducting classes, the closer it will seem to the small pupil.

- p. 3. **Tell what you see here!**  
Discussion about the number (1, 2, 3, 4, 5, many); about the form (quadrangle, square, triangle, cylinder, etc.); about location (on the right, on the left, close, far, high, low, above, under, behind, at (by), etc.).
- p. 4.—5. **Compare!**  
Notions: long — short, longer — shorter, thick — thin, thicker — thinner, broad — narrow, broader — narrower, large — small, larger — smaller, high — low, higher — lower, etc. The first notions about equal figures and equal objects.  
**What is to be found and where!**  
Notions: on the right, on the left, in the middle, behind, between, near, above, under, the upper one, the lower one, etc. (What is to be found in the upper row on the right? What figure is the last from the left side? In which row (under what) is the hawk? But where is the hen? And so on.)
- p. 7. **Finish the drawing!**  
After careful examination of every picture the children should try to find out what has been forgotten in the drawing in the last isle of the lower row. (A n s w e r s. 1st picture — a triangle (what figure?); 2nd picture — a blue square (what figure? in what colour?); 3rd picture — above: a hare, a hare; below: a cat, a cat.)
- p. 8. **Where is one! Where are many!**  
Notions: one, many.
- p. 9. **Find solution of the puzzle!**  
The children should be read such puzzles:  
1. A small, small man on one foot, a brown cap on. (A n e d i b l e   b o l e t u s)  
2. Two brothers run along the road, they never catch each other. (A b i c y c l e)  
3. A hundred bay steeds, they eat from one trough. (B e e s   a t   h i v e)  
4. Many bright sheep, a sole shepherd. (T h e   m o o n   a n d   t h e   s t a r s)  
The second image — basic notions of geometry.  
(Which line is straight? Curved? Broken? How many red dots? (One) How many black dots? (Many) How many straight lines pass through one point? Draw a curved line! Where are there such lines in the classroom? And so on.)
- p. 10. **Where is there more! Where less! Where is the number equal!**  
Notions: more, less, equal number. (Compare not saying aloud, but in one's mind arranging the elements of both the groups in the corresponding pairs. Will every squirrel get a nut? Will there be a berry next to every apple? Will there be an apple next to every berry? Thus...)
- p. 11. **What is most here! What is least here!**  
Notions: the largest amount, the smallest amount. (Compare of what is there more: girls or dolls? Dolls or prams? In which row is the number of circles largest? The least number of circles are of which colour? What can be said about the green and blue squares? Of which books are there more — the thin or thick ones? But which pile is the larger?)
- p. 12—13. **Groups.**  
Combining objects in groups according to some feature (colour, form, etc.). How many elements are there in each group? In which group is the number of elements largest (smallest)? In which group is there not a single element? (There are no blue cars and red trucks.)
- p. 14. **Various tasks for consolidating knowledge.**  
(One, many, more, less, equal number, above, under, at (by), next, on, etc.)



- p. 15. **Geometrical figures.**  
What figures are there on each of the three «shelves»? (a sphere, cylinder, cube, sphere, cube; cube, cone, etc.) Where are the red figures more? What colour are these figures? Which figure is above (under, behind, at, by) the red cone? What is next to the blue pyramid? But on the right (the left) from the black cube? And so on. But how are there the figures arranged in the lower pictures? Which figures are the most? Which the least?
- p. 16—17. **Number 1 and figure 1. Number 2 and figure 2.**  
What is there alone? Of what are there many? What does not grow in the garden any more? How many cabbages? How many swedes? But how many hares? In these two pages (and also further) sign «signals» are provided on the outer margin of the page for consolidation of the material. In the vacant square under corresponding sign «signal» the children should put the respective figure (or square with dots) cut out from the enclosure.
- p. 18. **How many!**  
How many nuts are there? Put there such figure on the square! How many knot-shaped biscuits? Put a figure corresponding to the number of the knot-shaped biscuits! How many cocks and how many hens? Of which is there more? Of which is there only one? Of which two?
- p. 19. **A pair.**  
How many objects are there in a pair? What is bought by the pair? Combine the objects in pairs! What is missing a pair? In what case a pair cannot be combined of two sandals?
- p. 20—21. **Signs  $>$ ,  $<$ ,  $=$ .**  
Compare the number of flowers! Of which flowers are there more? Of which less? Note how to put it down! Put the figures and the required sign under the chickens (insects!) Of which are there more — the large or small circles? The red or blue circles? How many black figures? How many yellow ones? And so on.
- p. 22. **Number 3 and figure 3.**
- p. 23. **How many! Of which are there more and of which — less! Triangle.**  
Put the corresponding figures under the discs (under the squares)! Read the figures obtained! (1, 2, 3, and 3, 2, 1).  
How many sides has a triangle? But how many angles? Compose the same figures of your sticks!
- p. 24. **Composition of number 3.**  
How in different ways can one pay 3 kopecks for a purchase? How in various ways a bunch can be formed of three flowers? How many apples are there? How many cherries? What is there more?
- p. 25. **Comparison of numbers within the range from 1 to 3.**  
Place the corresponding numbers and signs (for example,  $1 < 2$ ). Read! (One is less than two) Compare the circles (squares) in two different ways: according to the colour and according to the size!
- p. 26. **Number 4 and figure 4.**
- p. 27. **Composition of number 4.**
- p. 28. **Comparison of numbers within the range from 1 to 4. Square, quadrangle.**
- p. 29. **Repetition of numbers within the range from 1 to 4.**
- p. 30. **Number 5 and figure 5.**

- p. 31. **Composition of number 5. Pentagon.**
- p. 32. **How many! Row of numbers.**  
Tell at once (without counting) how many cucumbers (carrots) there are! How could you tell so quickly? And so on.
- p. 33. **The next number and the previous one.**  
Tell how the next number can be derived from the previous one! But in what way can the previous one of a certain number be obtained?  
Note:  $3 < 5$ , but  $5 > 3$ !  
Compare 4 and 2! Give two answers!
- p. 34. **Which in turn!**  
Who goes the first? The second? ... The fifth? What figure is the fourth? What colour is the third figure? Which hare is not in line? Where must the green ball be rolled in? And so on.
- p. 35. **Addition.**
- p. 36. **Addition of numbers within the range from 1 to 5.**  
Compose examples making use of the figures and marks from the enclosure. Read the obtained examples!
- p. 37. **Number 6 and figure 6.**
- p. 38. **Composition of number 6.**  
How can you pay 6 kopecks in different ways? How can you put 6 socks? How can you quickly tell how many subjects there are?
- p. 39. **Comparison of numbers within the range from 1 to 6. Addition.**  
Compare (add) the numbers using the draughts! Making this task in writing, the operations should be arranged in 3 columns, 2 rows in each column.
- p. 40. **Different sums within the range of numbers from 1 to 6.**
- p. 41. **Subtraction.**
- p. 42. **Let's go shopping!**  
Which of these things do you wish to buy? How much does it cost? What coins will you use to pay this sum? How many kopecks will be left? What else can you buy for the money left?
- p. 43. **Compose and do the tasks!**  
There are 3 tractors working at one side of the field, but 2 tractors — on the other side. How many tractors are there in this field? There were 6 wagons on the rails. The locomotive took away 3 wagons. How many wagons were left? The dot denotes the number at the last task. What is this number? Can any other number be put instead of the dot?
- p. 44. **Number 0 and figure 0.**  
By discussing the events in the cloak-room, gradually the tasks must be composed which can be solved by the following sums:  $4-1=3$ ,  $3-1=2$ ,  $2-1=1$ ,  $1-1=0$ . When the last cap is taken from the hanger, there will be no caps left, there will be 0 caps on the hanger.
- p. 45. **Consolidation of the notion «zero».**
- p. 46. **Straight line, cut. Ray. Centimetre.**  
Measuring of the cut length (in centimetres).
- p. 47. **Ray of numbers. Zero in sums.**  
Count how many elements each of the six groups contains! Where is this group situated on the ray? Which group contains the least elements? But which the most? How many elements does each next group differ by from the previous one?



Note the order of the numerals on the ray! Which number is on the right (on the left) from 5?

p. 48—49. **Tell what you see here! Is everything correct here!**

These two pages are meant for relaxation. But the pages contain various tasks arranged in a humoristic manner according to their contents. First, the children should be allowed to have «a heart-to-heart» talk about the confusion which has taken place at the Zoo, and only then the mathematical contents should be paid attention to. (What is wrong here? How should it be in reality? How many elements does each group of animals contain? Which group has the most? And so on.) The children make also «pictograms» and tell orally in a complete sentence how many animals or birds there are, respectively. (Insert the marks  $>$ ,  $<$ ,  $=$  between the numbers!)

p. 50. **Number 7 and figure 7.**

p. 51. **Composition of number 7.**

p. 52. **Compose and solve the task! Ordinals. Puzzles.**

1. There are seven birds in a nest, one side of each bird is black, the other is white. (The days of the week)

2. There are seven holes in a ball. (The head)

p. 53—54. **Different sums with the numbers within the range of 1 to 7.**

p. 55. **Number 8 and figure 8.**

p. 56. **Composition of number 8.**

p. 57. **Comparison of numbers. Ordinals.**

How many squares (dots, triangles, flags, etc.) are there in the 1st square of the 1st row? But in the middle triangle of the 2nd row?

Name all the figures in turn! What is the seventh figure like? What is the third figure from the left? How many circles are there? But how many polygons?

p. 58. **Compose and solve the task!**

p. 59. **Different tasks!**

Name the omitted numbers! What number has been substituted by the yellow «square»? Name the «neighbours» of number 3! How many different pairs are there?

What figure can be made of 8 sticks? How many triangles can be made? How many sticks are left? (Here are several answers — triangles can be shifted and grouped differently.)

p. 60. **Number 9 and figure 9.**

p. 61. **Composition of number 9.**

p. 62. **Different tasks (for repetition and consolidation of knowledge).**

p. 63. **Solve the puzzle!**

1. Two horns, two peepers, four are tramping the earth, one flag bearer. (A cow)

2. Two heads, six legs. (A rider on the horse)

3. Two little lambs, each having five little legs. (Gloves)

4. Four brothers are walking along the road, but do not catch up each other. (The seasons)

p. 64—65. See Instructions for p. 48—49.

p. 66. **Number 10 and the way how to write it.**

By discussing a trip in a helicopter the attention of the children should be directed to the names of ordinals. (What is the ticket number of the squirrel? Which passenger has ticket number 8? Which is the last one to enter the heli-

copter? And so on.) To give the answer to the question how many passengers all together want to go, the necessity arises to have a new number — 10. The writing of number 10 should be explained — here two figures denote a single number.

p. 67. **Composition of number 10.**

p. 68—69. **Even numbers and odd numbers.**

p. 70. **How many objects are there in each picture!**

*How many objects are missing in order to have 10 of them? Which of the ten groups has the most (the least) elements? And so on.*

p. 71. **Compose and solve the tasks!**

*Put such a figure beside each number to have the sum of 7 (8, 9, 10)!*

p. 72. **Let's go shopping!**

*How many dots are there on each side? How many all together? How many are needed to make 10? And so on.*

p. 73. **Decimetre.**

*Measurement of cut length and their comparison.*

p. 74. **Solve the puzzle!**

1. Two mothers have five children, all of them have the same names. (*Fingers*)

2. Only one leg, but ten tongues. (*A tree and its branches*)

3. Four are running, four are chasing them. (*A horse and a cart*)

4. A little house has no windows, five small chambers, two black men are in each of them. (*An apple*)

*By covering the lower picture on the right, the children first name and count all the domestic animals in the picture on the left. After that, attentively watching the picture on the right, the children should tell which of these animals have no baby-animals. But which little one has no mother?*

p. 75. **Different tasks in the range of numbers from 1 to 10.**

*Where is the bird, holding a figure, hurrying? Is it held correctly? Can the figure, held by the bird, be used somewhere else? What is the way out? Where is the little mouse, holding a figure, going to? Which figures will be left? And so on.*

p. 76. **The property of shifting in addition.**

p. 77. **The use of the property of shifting in addition.**

p. 78. **Addition and subtraction making use of the ray of numbers.**

p. 79. **Relation between addition and subtraction.**

p. 80. **A half. Division into two equal parts.**

p. 81. **One-fourth. Different tasks.**

*The third picture can be used in different ways, for example, the children can be asked to add both the numbers; to subtract them; to look for such a third number in order to get 10.*

p. 82. **Litre. A glass (one-fourth of a litre).**

*Compose and solve the tasks.*

p. 83. **Addition and subtraction gradually one at a time.**

p. 84—85. **Numbers from 10 to 20.**

p. 86. **Kilogram. Weighing. Tasks trying one's wit.**

p. 87. **Numbers from 21 to 100.**

p. 88. **A rouble. Different simple tasks in the range of numbers from 1 to 100.**

p. 89. **A year, months, seasons.**

p. 90. **A clock. Twenty-four hours.**



p. 91. **Night, morning, day, evening. Daily schedule.**

In the last task it should be approximately told what time is shown here (full hours).

p. 92—93. **Tell what you see here!**

Making use of the events depicted here, one can discuss different means of transport and their speed, traffic rules, number of seats in different vehicles, the use and purpose of each of them in practical life, etc. The children can be asked to find how many wheels the vehicles have all together, how many people can be transported, for example, by means of a plane and bus together. And so on. When composing «pictograms», two-figure numbers should be placed on the right of the picture.

p. 94—95. **Revision.**

1. How many figures are there in the upper row and how many — in the lower row? How many figures all together? Of which figures are the most (the least)? What is beside the red circle? What figure is above the red square? How many different groups can all the 10 figures be divided into? And so on.

2. Continue the started row! What are the numbers of the first (the third) row called?

3. How many triangles (squares, circles) are there in each of these figures?

4. Write examples of addition and subtraction corresponding to each of the pictures!

5. Can you find the examples in the columns with equal results? Which examples have no «pair»?

6. What part of each figure is coloured?

7. Compose two examples of addition corresponding to each row of the figures! ( $2+3=3+2$ ) What property is characteristic of addition?

8. Measure the lengths of the cuts and compare them!

9. Kick the ball in the «proper» gate! How many balls will there be in each gate? Which ball cannot be kicked into any of these gates?

10. Figure it out!

11. How many dots are there on the cut part? How can it be figured out?

12. Compose different tasks and solve them!

13. Calculate!

p. 96. **The first task.** Which of the nine pictures has no pair?

**The second task** is actually a game «Which will reach 100 first». But the field of the game can be used for other tasks, to consolidate the knowledge within the range of 100.

#### TRANSLATION OF THE WORDS MET IN SOME PICTURES

kino — cinema

piens — milk

Coins you see in this and other pages are used in the Soviet Union.

Numbers with a dot, for example, 1., 5., 10. denote ordinal numbers the first, the fifth, the tenth.

The first (1.)

zīmulji — pencils

(Appendix) olas — eggs

The second (2.)

līme — glue

piens — milk

The third (3.)

tuša — Indian ink

(Appendix) piens — milk

The fourth (4.)

piens — milk

siers — cheese

The fifth (5.)

cukurs — sugar

pasts — post-office

miers — peace



1



2



3



5



6



8



27P00

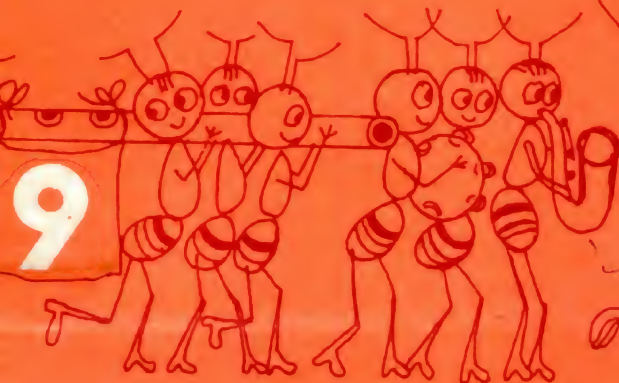




4



7



9



10

